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Управління дебіторською заборгованістю та фактори впливу на її якість

О. Єлісєєва[‡], В. Бєлозерцев[#]

Мета роботи. Науково обґрунтувати фактори впливу на якість управління дебіторською заборгованістю.

Дизайн/Метод/План дослідження. Застосовано системний підхід та методи синтезу, семантичного аналізу, історичного аналізу, аналогій, узагальнення, пояснення, класифікації та графічній.

Результати дослідження. Управління дебіторською заборгованістю, яка для підприємства продавця є боргами покупців, – це один зі складників сучасних відносин між підприємствами. Обмеженість ресурсів вимушує управлінців добирати інструменти і джерела фінансування продажу з відстроченням платежу, а також аналізувати фактори, які впливають на якісні характеристики управління таким відстроченням. Наведено та проаналізовано підсистему управління дебіторською заборгованістю, у якій виділено значущі для ефективного управління в системі менеджменту підприємств фактори (елементи), що зазвичай аналізують та корегують під час управління рівнем дебіторської заборгованості. Доведено, що ця підсистема потребує уточнення з урахуванням факторів макросередовища. Наголошено, що фактори впливу доречно виокремити для підприємств оптової торгівлі, оскільки у ланцюгу оптових продажів порівняно з роздрібною торгівлею націнка вартості товару зменшена та необхідно фінансово забезпечити реалізацію товарів із відстроченням платежу. Управління дебіторською заборгованістю вважається якісним та ефективним, коли внаслідок такого управління підприємства стають фінансово стійкими. Удосконалено систему факторів, де головна роль належить економічним факторам, запропоновано підхід до їх кількісної оцінки.

Теоретичне значення дослідження. Запропоновано теоретичну дворівневу математичну модель кількісної оцінки факторів впливу на якість управління дебіторською заборгованістю підприємств.

Практичне значення дослідження. Результати дослідження можуть бути використані в управлінні дебіторською заборгованістю підприємств, формуванні інструментів оцінювання якості дебіторської заборгованості та виділенні основних факторів впливу на якість дебіторської заборгованості.

Оригінальність/Цінність/Наукова новизна дослідження. Узагальнено, структуровано та досліджено зміст окремих факторів впливу на якість управління дебіторською заборгованістю.

Перспективи подальших досліджень. Розробка комплексного прикладного механізму управління дебіторською заборгованістю з урахуванням факторів впливу на її якість та галузевих особливостей підприємств.

Тип статті. Теоретичний.

Ключові слова: дебіторська заборгованість, боргові відносини, інфляція, резерв сумнівних боргів.

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Receivables management and factors influencing its quality

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Purpose. To scientifically substantiate the factors influencing the quality of receivables management.

Design/Method/Research approach. This study uses a systematic approach and methods of synthesis, semantic analysis, historical analysis, analogies, generalization, explanation, classification and graphic are applied.

Findings. Management of receivables, which for the seller's company are the debts of buyers - is one of the components of modern relations between enterprises. Limited resources force managers to select tools and sources of financing sales with deferred payment, as well as to analyze the factors that affect the quality of management of such deferred payment. The subsystem of receivables management is presented and analyzed, in which the factors (elements) important for effective management in the enterprise management system are highlighted, which are usually analyzed and corrected during the management of the level of receivables. It is proved that this subsystem needs to be refined taking into account the factors of the macroenvironment. It is emphasized that the factors of influence should be singled out for wholesalers, as in the wholesale chain compared to retail trade, the markup on the value of goods is reduced and it is necessary to financially ensure the sale of goods with deferred payment. Accounts receivable management is considered to be high quality and efficient when, as a result of such management, enterprises become financially stable. The system of factors, where the main role belongs to economic factors, is improved, the approach to their quantitative estimation is offered.

Theoretical implications. The theoretical two-level mathematical model of quantitative estimation of factors of influence on quality of management of receivables of the enterprises is offered.

Practical implications. The results of the study can be used in the management of receivables of enterprises, the formation of tools for assessing the quality of receivables and identify the main factors influencing the quality of receivables.

Originality/Value. The scientific novelty of the research is the content of separate factors of influence on the quality of receivables management is generalized, structured and investigated.

Research limitations/Future Research. Prospects for further research is the development of a comprehensive application mechanism for managing receivables, taking into account the factors influencing its quality and industry characteristics of enterprises.

Paper type. Theoretical.

Keywords: receivables; debt relations; inflation; reserve for doubtful debts.

Управление дебиторской задолженностью и факторы, влияющие на ее качество

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Цель работы. Научно обосновать факторы, влияющие на качество управления дебиторской задолженностью.

Дизайн/Метод/План исследования. Применены системный подход, методы синтеза, семантического анализа, исторического анализа, аналогий, обобщения, объяснения, классификации, графический.

Результаты исследования. Управление дебиторской задолженностью, которая для предприятия продавца является долгами покупателей, – это один из компонентов современных отношений между предприятиями. Ограниченность ресурсов вынуждает управленцев подбирать инструменты и источники финансирования продаж с отсрочкой платежа, а также анализировать факторы, влияющие на качественные характеристики управления такой отсрочкой. Приведена и проанализирована подсистема управления дебиторской задолженностью, в которой выделены значимые для эффективного управления в системе менеджмента предприятий факторы (элементы), которые обычно анализируют и корректируют при управлении уровнем дебиторской задолженности. Доказано, что эта подсистема требует уточнения с учетом факторов макросреды. Отмечено, что факторы влияния целесообразно выделить для предприятий оптовой торговли, поскольку в цепи оптовых продаж по сравнению с розничной торговлей наценка стоимости товара уменьшена и необходимо финансово обеспечить реализацию товаров с отсрочкой платежа. Управление дебиторской задолженностью считается качественным и эффективным, когда в результате такого управления предприятия становятся финансово устойчивыми. Усовершенствована система факторов, где главная роль принадлежит экономическим факторам, предложен подход к их количественной оценке.

Теоретическое значение исследования. Предложена теоретическая двухуровневая математическая модель количественной оценки факторов влияния на качество управления дебиторской задолженностью предприятий.

Практическое значение исследования. Результаты исследования могут быть использованы в управлении дебиторской задолженностью предприятий, формировании инструментов оценки качества дебиторской задолженности и выделении основных факторов влияния на качество дебиторской задолженности.

Оригинальность/Ценность/Научная новизна исследования. Обобщенно, структурировано и исследовано содержание отдельных факторов влияния на качество управления дебиторской задолженностью.

Перспективы дальнейших исследований. Разработка комплексного прикладного механизма управления дебиторской задолженностью с учетом факторов влияния на ее качество и отраслевых особенностей предприятий.

Тип статьи. Теоретический.

Ключевые слова: дебиторская задолженность; долговые отношения; инфляция; резерв сомнительных долгов.

1. Вступ

В умовах глобальних викликів сьогодення відносини між підприємствами потерпають нових змін та перетворень. В умовах конкуренції значно ускладнилися боргові відносини (*Siekelova, Kliestik, Svabova, Androniceanu, & Schönfeld, 2017*). Управління дебіторською заборгованістю – одна зі складових таких відносин між підприємствами. Результат господарської діяльності кожного підприємства – це наявність, в тому чи іншому розмірі, дебіторської заборгованості (*Purwanti, 2019*). При наявності дебіторської заборгованості треба шукати рішення між ризиком та дохідністю. Тому актуальна оптимізація її розміру.

Оптимальний об'єм дебіторської заборгованості досягається балансом між виграшами, які можливо отримати завдяки інвестованим коштам у дебіторську заборгованість, та здійсненим затратам для цього. Управління дебіторською заборгованістю розглядається як складова менеджменту підприємства, і полягає у визначенні процедури відносно контрагентів щодо реалізації ними товарів (продукції) в кредит.

У більшості ситуацій підприємство балансує між потенційними виграшами та ризиками в умовах обмежених ресурсів. Обмеженість фінансових ресурсів, які можуть бути виділені на дебіт покупців, вимушує шукати управлінців інструменти і джерела фінансування продажу з відстроченням платежу, а також аналізувати фактори, які впливають на якісні характеристики такого відстрочення.

2. Огляд літератури

На сучасному етапі економічної еволюції в менеджменті підприємств широко використовують поняття «кредитна політика», «кредитний менеджмент», «управління дебіторською заборгованістю».

Більшість вітчизняних й зарубіжних економістів визначають управління дебіторською заборгованістю як вироблення комплексу рішень щодо продажу робіт, товарів, продукції або послуг із відстроченням платежу (*Klimova, 2017; Giedt, 2018; Zimon, 2018; Purwanti, 2019*).

Вітчизняні дослідники у більшості своїй ототожнюють поняття «управління дебіторською заборгованістю» та «кредитна політика» (*Utkina, 2005*), що може бути пов'язано з історичними особливостями розвитку економічних відносин в Україні. Але таке ототожнення, на нашу думку, звужує поняття «управління дебіторською заборгованістю».

І. Бланк визначає, що на підприємствах для управління дебіторською заборгованістю треба розробляти особливу фінансову політику управління дебіторською заборгованістю або кредитну політику відносно покупців продукції (*Blank, 2011*). В роботі «Управління активами» він дає таке трактування кредитної політики: «кредитна політика (credit policy) – механізм управління дебіторською заборгованістю, що розробляється підприємством. Виробничо-комерційні підприємства формують кредитну політику при наданні покупцям товарного (комерційного) або споживчого кредиту» (*Blank, 2011*). Але, на нашу думку, управління дебіторською заборгованістю не має обмежуватися тільки розробкою та застосуванням певних норм кредитної політики підприємства. В процесі управління дебіторською заборгованістю повинні враховуватися і фактори впливу на її розмір та якість, визначатися та застосовуватися інструменти погашення заборгованості.

Однак є й інша група авторів (*Klimova, 2017; Giedt, 2018; Frennea, Han, & Mittal, 2019; Purwanti, 2019*), які розрізняють поняття «управління дебіторською заборгованістю» та «кредитна політика підприємства» та розглядають управління дебіторською заборгованістю як компонент системи управління підприємством.

Управління дебіторською заборгованістю є стратегічно важливим в системі управління підприємством як виробничим, так і торгівельним; і розглядається як тактика і стратегія підприємств в області товарних кредитів та невизначених боргів (*Volnin, 2010*). Як наведені вище, так і останнє визначення не враховують основні особливості та фактори ефективності управлінського процесу. Разом з тим, у визначеннях наявні поодинокі основні значущі фактори якості управління дебіторською заборгованістю, зокрема, як у вищенаведеному визначенні – стратегія та тактика у наданні кредитів.

Таким чином, у різних трактуваннях вже наявна основа для виокремлення факторів якісного управління дебіторською заборгованістю, але систематизованої класифікації таких факторів поки що нами не виявлено. Отже, необхідна деталізація та систематизація цих факторів. Поряд з цим, різноманіття факторів, які формують дебіторську заборгованість, робить наукову систематизацію дуже складною.

3. Мета дослідження

Мета дослідження – науково обґрунтувати фактори впливу на якість управління дебіторською заборгованістю. Завдання дослідження – деталізувати та систематизувати фактори, які впливають на якість та динаміку дебіторської заборгованості; виявити показники факторів впливу на якість та динаміку дебіторської заборгованості.

4. Результати та їх обговорення

4.1. Управління дебіторською заборгованістю в системі менеджменту

В роботі використано визначення управління дебіторською заборгованістю, що сформульовано нами в процесі дослідження. Так, управління дебіторською заборгованістю включає методи і принципи роботи з потенційними та існуючими дебіторами, пошук інструментів фінансування та рефінансування дебіторської заборгованості, залучення коштів для реалізації товарів з відстроченням платежу.

Управління дебіторською заборгованістю – це прийняття рішень відносно пошуку надійного покупця, обсягу та строків погашення дебіторської заборгованості. Управління дебіторською заборгованістю – це стратегічний розвиток підприємства. На цій основі базується реалізація тактичних заходів по досягненню цілей управління підприємством. Для покупців товару політика має бути гнучкою з можливістю швидких змін залежно від мікро- та макрофакторів (*Purwanti, 2019*).

В. Бєлозерцев (*Belozertsev, 2012*) запропонував таке визначення управління дебіторською заборгованістю – сукупність методів і принципів взаємодії підприємств з клієнтами у відносинах реалізації послуг або активів, організації фінансового забезпечення боргової активності та інкасації заборгованості з урахуванням факторів мікро- і макросередовища з метою узгодження і регулювання інтересів підприємства і контрагентів, забезпечення в довгостроковій перспективі його фінансової стійкості.

На основі аналізу підходів відносно управління дебіторською заборгованістю підприємств (*Kostirko, 2011; Giedt, 2018*) сформована та відображена на *рис. 1* підсистема управління дебіторською заборгованістю, у якій виділено фактори (елементи), які автори вважають значущими для цього процесу в системі менеджменту підприємств.

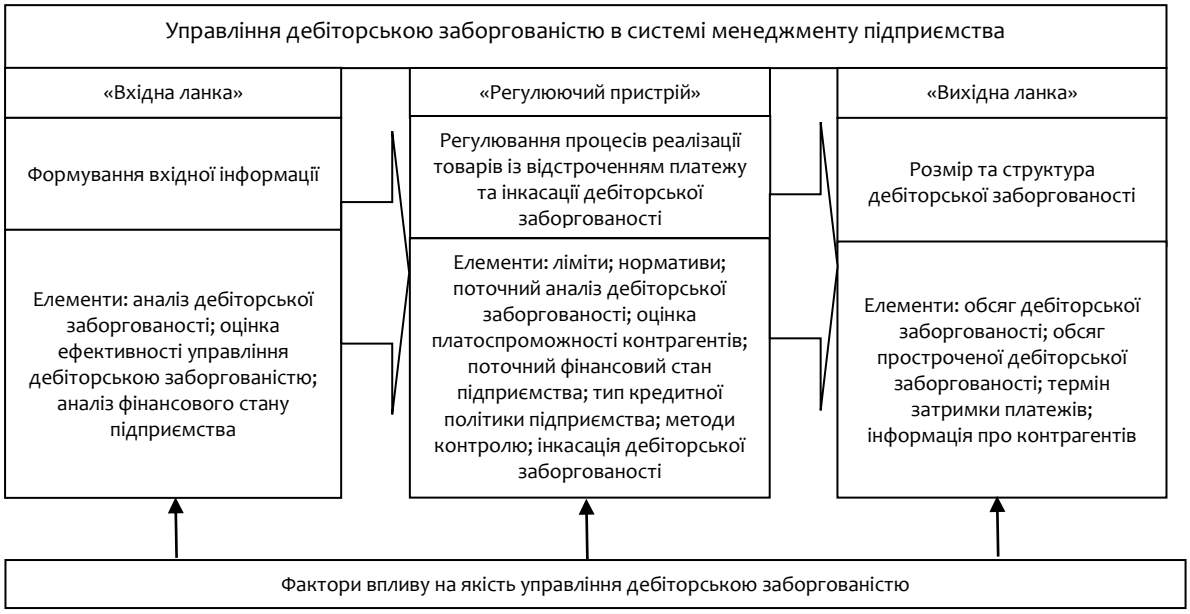


Рисунок 1: Підсистема управління дебіторською заборгованістю в системі менеджменту підприємства*

**Джерело*: розроблено авторами на основі досліджень (*Kostirko, 2011; Giedt, 2018*).

4.2. Фактори впливу на дебіторську заборгованість

В наведеній підсистемі фактори макросередовища, які доцільно аналізувати в процесі управління дебіторською заборгованістю, не враховані. Увага більшості авторів приділяється факторам мікросередовища (стан контрагентів; стан підприємства) (*Klimova, 2017; Siekelova et al., 2017; Giedt, 2018; Zimon, 2018; Purwanti, 2019; Frennea, 2019*).

Вищезазначене вказує на необхідність вимірювання ефектів від управління дебіторською заборгованістю. Так, наприклад, Л. Костирко відзначає, що на практиці рішення про надання або обмеження товарного кредиту контрагенту ухвалюються керівництвом підприємств без урахування впливу обраної кредитної політики на майбутні фінансові результати. Це потребує розробки методичних засад формування кредитної політики на новій парадигмі (*Kostirko, 2011*). Автор вважає, що фінансовий стан підприємства залежить від швидкості перетворення інвестованих у дебіторську заборгованість коштів на кошти реальні. На думку автора, ефективність управління дебіторською заборгованістю характеризується показниками рентабельності, платоспроможності, фінансової стійкості.

Необхідною умовою результату управління дебіторською заборгованістю є фінансова стійкість. Суб'єкти господарювання в умовах конкуренції повинні формувати стійкий фінансовий механізм для забезпечення своєї операційної діяльності (*Bei, & Wijewardana, 2012*). Впродовж всієї фінансово-господарської діяльності формується стійкий фінансовий стан підприємства (*Kumsta, & Vivian, 2019*). Тлумачення фінансової стійкості в дослідженнях різноманітне. Окремі автори (*Sági, & Lentner, 2020*) формулюють поняття фінансової стійкості через досягнення підприємством необхідних фінансових параметрів; під стійким фінансовим станом підприємства вони розуміють ступінь забезпеченості підприємства необхідними для господарської діяльності фінансовими ресурсами та своєчасність здійснення грошових розрахунків за своїми боргами та зобов'язаннями. Так, вважається, що фінансовий стан підприємства стійкий, якщо підприємство досягає необхідних параметрів у напрямах рентабельності (прибутковості), наявності власних фінансових ресурсів, раціональному розміщенні коштів, ліквідності та платоспроможності (*Sági, & Lentner, 2020; Dolgikh, Panfilova, & Smorodina, 2020*).

Слід відзначити, що в оптовій торгівлі через зменшену націнку товару, порівняно з роздрібною торгівлею, є необхідність фінансового забезпечення реалізації товарів із відстроченням платежу (*Klimova, 2017*). Отже, питання управління дебіторською заборгованістю постає перед такими підприємствами з більшою гостротою.

Доречно приділити увагу функціонуванню підприємств оптової торгівлі, адже вони накладають специфічний відбиток на управління дебіторською заборгованістю підприємств та вибір інструментів погашення заборгованості. Для порівняння виокремимо певні особливості оптової торгівлі, що впливають на управління та формування дебіторською заборгованістю (*Lishchenko, & Beskosta, 2012*). Розглянемо категорії покупців, що є характерними для роздрібної та оптової торгівлі. Для роздрібної торгівлі – це переважно фізичні особи, які не є суб'єктами підприємницької діяльності, а для оптової – основними покупцями виступають саме суб'єкти підприємницької діяльності. На підприємствах оптової торгівлі це створює передумови виникнення товарної дебіторської заборгованості. Відносно підприємств роздрібної торгівлі, то утворення дебіторської заборгованості, що не відноситься до реалізації товарів, майже не відбувається. Причина в тому, що покупцями виступають переважно фізичні особи. Розрахунки в основному відбуваються в готівковій формі одночасно з переміщенням товарів по відповідним ланкам. Для підприємств роздрібної торгівлі характерне утворення дебіторської заборгованості, яка не пов'язана з реалізацією послуг, робіт, товарів. Для підприємств оптової торгівлі необхідно відрізняти якість та структуру дебіторської заборгованості.

Для оптової торгівлі характерні значна кількість покупців і великі обсяги реалізації товарів. Це обумовлює групування контрагентів за певними критеріями, щоб оптимізувати дебіторську заборгованість, та мінімізувати ризики неповернення боргу (*Krylov, 2020*). Тому за складом контрагентів треба робити аналіз структури дебіторської

заборгованості (відношення обсягів дебіторської заборгованості певних контрагентів до загального обсягу дебіторської заборгованості).

Таким чином, щоб управління дебіторською заборгованістю було ефективним, підприємства оптової торгівлі мають бути фінансово стійкими; до основних показників фінансової стійкості можна віднести прибутковість кредитних операцій (R_p); коефіцієнт оборотності кредиторської заборгованості за товари ($К_{Об\ к}$); коефіцієнт оборотності дебіторської заборгованості за товари ($К_{Об\ д}$); коефіцієнт поточної ліквідності (*К п.л*); якість дебіторської заборгованості (D_q).

Взаємодія з контрагентами включає такі елементи: спосіб погашення заборгованості; штрафи та знижки відповідно за прострочення платежу та дострокове погашення заборгованості. Товарне кредитування має такі параметри: з відстроченням платежу обсяг реалізації товару і строки надання товарного кредиту.

Перед прийняттям рішення про надання товарного кредиту робиться кредитний аналіз, результатом якого має стати рішення про доцільність надання кредиту певному контрагенту та визначення обсягу кредиту. Кредитний аналіз передбачає одержання, вивчення і обробку інформації для рішення про відвантаження продукцію з відстроченням платежу (*Kozka, 2010*). Під час кредитного аналізу вивчають платоспроможність, ділову репутацію та особливості забезпечення надання кредиту.

Під час аналізу платоспроможності контрагентів існує ймовірність недостовірності інформації та швидкого її знецінення після одержання. Тому дані щодо ненадання або надання товарного кредиту не досить якісні. Основними показниками оцінки платоспроможності підприємства виступають коефіцієнт абсолютної ліквідності; коефіцієнт загальної ліквідності; коефіцієнт швидкої ліквідності; коефіцієнт поточної ліквідності.

На основі аналізу вищезазначених джерел і власних спостережень запропоновано всі фактори впливу на рівень дебіторської заборгованості віднести до двох головних груп: внутрішніх та зовнішніх. Джерелом внутрішніх факторів є підприємство. Ці фактори регульовані підприємством. Зовнішні фактори – це фактори зовнішнього середовища; їх можна поділити ще на дві групи: макросередовища та близького оточення підприємства (назвемо факторами мікросередовища, але відокремлюватимемо цю групу від факторів внутрішніх) (*Belozertsev, & Gunya, 2014*).

До факторів макросередовища відносять економічні (макроекономічні) та організаційно-правові фактори (*Inessa, Artem, & Wielki, 2019*), причому останні об'єднані в одну групу, бо вони взаємообумовлені і майже не піддаються кількісному вираженню.

Організаційно-правові фактори макросередовища – це результати діяльності системи органів державної влади (контроль і забезпечення дотримання суб'єктами господарювання платіжної дисципліни) та вплив інфраструктурних організацій (банки, аудиторські, консалтингові компанії, факторингові). До нормативно-правових факторів слід віднести такі складові елементи, як законодавчі (закони, що регулюють боргові відносини між підприємствами та платіжний оборот суб'єктів господарювання) і нормативні (розпорядження, інструкції та накази стосовно боргових відносин і регулювання платіжного обороту).

До макроекономічних факторів економічного характеру, які впливають на рівень дебіторської заборгованості підприємств, можна віднести інфляцію, рівень ВВП, резерв сумнівних боргів, зміну курсу національної валюти, грошової маси, облікової ставки НБУ, купівельної спроможності населення, податкове навантаження. Далі наведено детальне пояснення впливу кожного з названих факторів.

Вплив інфляції на дебіторську заборгованість підприємств

У періоди інфляції реальна вартість грошових активів втрачається; зростає кредитна заборгованість, застосовується агресивна політика реалізації товарів, зростає дебіторська заборгованість. В таких умовах підприємство зацікавлено у конвертації грошових коштів в запаси матеріалів, сировини, палива, товарів, тощо (*Coibion, Gorodnichenko, & Ropele, 2019*). Через вплив інфляції у складі активів підприємства відбуваються структурні зміни, і як наслідок – утворюється неякісна дебіторська заборгованість.

Такі ж процеси відбуваються і у покупців (контрагентів). Кредиторську заборгованість в цей час вигідно збільшувати та несвоєчасно її погашати, оскільки через інфляцію вартість товарного кредиту з часом знецінюється. Отже, якщо монетарні активи зростають над монетарними пасивами, то при зростанні цін ці активи знецінюються (*Aggarwal, & Tyagi, 2018*). Існує не тільки зв'язок між якістю дебіторської заборгованості та темпами інфляції, але й наявність прострочених боргів та високих темпів їх приросту викликають нові витки інфляції (*Karadağ, 2018*).

Вплив ВВП на боргові відносини між підприємствами та дебіторську заборгованість

Несвоєчасне погашення боргових зобов'язань в кранi є перешкодою для економічного зростання, на яке націлена економічна політика всіх держав, і одним із показників якого показник ВВП (*Tacchella, Mazzilli, & Pietronero, 2018*). Розповсюдження неплатежів між підприємствами має ланцюговий характер; прострочена заборгованість в одних секторах економіки зумовлює виникнення неплатежів в інших галузях економіки. Неплатежі у вигляді безнадійної або простроченої заборгованості впливають на збутову та заготівельну діяльність ланцюга суб'єктів господарювання. Прострочена дебіторська заборгованість за товари, яка виникла у кінцевому секторі споживання, розповсюджується і на виробників продукції (*Stam, & Westerman, 2018*). Через деякий час підприємство-виробник без високоліквідних активів поступово скорочує виробництво. У підприємств-одержувачів продукції відбувається зменшення об'ємів реалізації товарів. В таких умовах треба залучати нових покупців, розширяти ринки збуту продукції, збільшувати ціни реалізації товару. Це призводить до зростання простроченої, неякісної і безнадійної дебіторської заборгованості. Усе це передається вище по ланцюгу.

Резерв сумнівних боргів

Окрім придбаної заборгованості і заборгованості, яка призначена для продажу, дебіторська заборгованість являється активом. Всі підприємства зобов'язані створювати резерв сумнівних боргів. Податківці в листах на тему безнадійної заборгованості також підкреслюють, що такий резерв треба створювати обов'язково. А в деяких консультаціях контролери вказують на те, що без створення такого резерву безнадійну заборгованість не вдасться включити до податкових витрат (*Oladnichuk, Konzeba, & Podlubna, 2019*).

Для створення резерву сумнівних боргів треба використовувати безнадійну заборгованість, у якої вже минув строк позовної давності і існує впевненість в її неповерненні боржником. Треба звернути увагу на обставини, що однозначно вказують на дебіторську заборгованість, що її не буде погашено. Зокрема, впевнено про неповернення дебіторської заборгованості можна говорити за умови виникнення таких обставин:

1) боржника було ліквідовано, або його визнано банкрутом, а правонаступників немає і заборгованість перед підприємством погашено не було;
2) за умовами мирової угоди, в тому числі, контрагентові було прощено борг;

3) до суду підприємство подало позов про стягнення з контрагента заборгованості, але за результатами оскарження стало зрозуміло, що суд його відхилив.

Якщо існує невпевненість у погашенні боржником поточної дебіторської заборгованості, то така заборгованість є сумнівною. На розмір резерву впливає застосування абсолютної суми сумнівної дебіторської заборгованості. Якщо дебіторська заборгованість виникає в ході операційного циклу і буде погашена з дати балансу протягом 12 місяців, то і за такою дебіторською заборгованістю (поточною) створюють резерв. Витрати на створення резерву включаються до складу інших витрат операційної діяльності.

В методі застосування абсолютної суми сумнівної заборгованості найпростіше регулювати розмір резерву; за конкретними дебіторами, якщо їх заборгованість на підставі професійного аналізу визнана сумнівною, створюється резерв. Для цього:

1) у наказі про облікову політику зазначають ознаки сумнівної дебіторської заборгованості;
2) проводять аналіз на предмет відповідності дебіторської заборгованості встановленим критеріям на останнє число кварталу (дату балансу). Будь-яку заборгованість включають до резерву, якщо вона відповідає цим критеріям.

З метою мінімізації суми резерву можна встановити гранично «жорсткі» критерії віднесення дебіторської заборгованості до сумнівної (визнання дебітора банкрутом, наприклад). Якщо ж є намір створити резерв у максимальній сумі, то слід установити «м'які» критерії. Скажімо, визнавати дебіторську заборгованість сумнівною, якщо вона прострочена на певний строк (1 місяць або 10 днів). Принцип обачності може стати обґрунтуванням такої «м'якості».

Під товарною заборгованістю розуміють таку дебіторську заборгованість, що є наслідком перерахованої продавцеві попередньої оплати, за якою так і не були отримані роботи, послуги, товари. За такою заборгованістю резерв сумнівної заборгованості не створюють, тому що вона не є фінансовим активом, тому її включають до витрат у податковому та бухгалтерському обліку. Бажано, щоб заборгованість кваліфікувалася в бухгалтерському обліку за тими правилами, що й у податковому обліку (з позиції уніфікації даних бухгалтерського і податкового обліку).

Грошовою заборгованістю вважають дебіторську заборгованість покупця за реалізовані продавцем послуги, роботи, товари, що не були оплачені. При списанні такої заборгованості слід проаналізувати, чи значиться в балансі сальдо на рахунку «Резерв сумнівних боргів». Якщо сальдо за цим рахунком є, значить, було створено резерв. Тоді дебіторську заборгованість (безнадійну) списують з балансу за рахунок такого резерву.

Платники податку на прибуток, що коригують фінансовий результат на суму всіх різниць, повинні:

1) в бухгалтерському обліку установити такі ж критерії визнання безнадійної заборгованості, що й у податковому обліку;
2) розраховувати резерв таким чином, щоб сума безнадійної заборгованості списувалася на витрати, а не за рахунок резерву в періоді її визнання. Це можна здійснити, зокрема, за допомогою використання методу абсолютної суми сумнівної заборгованості, в якому можна передбачати створення резерву в мінімальній сумі.

Існують також інші способи розрахунку резерву сумнівних боргів, при застосуванні яких його сума дорівнюватиме нулю.

Позитивним моментом продажу товару з відстроченням платежу стосовно питання величини ВВП являється товарне кредитування, яке стимулює приріст об'ємів виробництва.

Вплив грошової маси на дебіторську заборгованість

Грошові агрегати та рівень монетизації внутрішнього валового продукту – це головні показниками, які характеризують рівень забезпеченості економіки коштами (*Inessa, Artem, & Wielki, 2019*). Низький рівень монетизації ВВП (нестача грошей в економіці держави) – одна з причин зростання простроченої дебіторської заборгованості, як показало дослідження цієї проблеми. Для ліквідації неплатежів прихильники пропонують нарощувати грошову масу, але від додаткової емісії ефект короткостроковий, він ненадовго підвищує ліквідність підприємств та скорочує прострочену заборгованість.

Дебіторська заборгованість та динаміка курсу національної валюти

Курс національної валюти в першу чергу впливає на структуру і динаміку дебіторської заборгованості імпортерів та експортерів робіт, послуг, товарів. Подорожчання національної валюти погіршує конкурентний та фінансового стану експортерів, і, як наслідок, призводить до накопичення боргів перед іншими секторами економіки (постачальниками ресурсів). Якщо курс національної валюти падає, це сприяє зростанню затратної частини у підприємств, орієнтованих на імпорт (*Karpenko, Karpova, Grigorieva, Savenkova, & Guirinskiy, 2017*). У довгостроковій перспективі така тенденція спричиняє підвищення рівня інфляції. Як наслідок, у боргових відносинах між підприємствами починаються негативні процеси.

Вплив середньої ставки по кредитах та облікової ставки НБУ на динаміку та структурні зміни дебіторської заборгованості

Кредит має функцію перерозподілу, оскільки накопичені тимчасово вільні кошти одних економічних суб'єктів спрямовуються на певний строк за певну плату через кредитні установи на потреби інших економічних суб'єктів. Розглянемо ситуацію в плані формування та погашення дебіторської заборгованості. Для господарчих суб'єктів товарний кредит більш привабливий порівняно з банківським кредитом. При зменшенні відсоткових ставок по банківських кредитах для господарчих суб'єктів може спостерігатися позитивна динаміка у боргових відносинах між підприємствами. Динаміка облікової ставки НБУ опосередковано через банківські кредити впливає і на боргові процеси між підприємствами, а отже, і на структурні зміни і динаміку дебіторської заборгованості підприємств.

Дебіторська заборгованість і купівельна спроможність населення

Купівельна спроможність населення безпосередньо впливає на боргові відносини між господарчими суб'єктами, що пов'язані з різними галузями виробництва, реалізації, перерозподілу та розподілу споживчих товарів через зростання попиту на них. Динаміка реальної заробітної плати являється індикатором купівельної спроможності населення.

Вплив податкового навантаження на дебіторську заборгованість

Податкове навантаження впливає на боргові відносини між підприємствами через зростання затратної частини господарчих суб'єктів. Податки закладаються у собівартість продукції, це впливає на вартість реалізованих товарів (робіт, послуг). По-перше, збільшуються об'єми дебіторської заборгованості; по-друге, при посиленні податкового навантаження запускаються інфляційні механізми, що теж впливає на формування і погашення дебіторської заборгованості.

Що стосується зовнішніх факторів мікроекономічного рівня – економічних й організаційних, то їх трансляторами є найближче оточення суб'єкта господарювання. На якість дебіторської заборгованості на цьому рівні безпосередньо впливають покупці продукції (контрагенти підприємства).

Економічні фактори мікросередовища – це платіжна дисципліна покупця; платоспроможність покупця; використання негрошових способів погашення дебіторської заборгованості; економічна впливовість та вагомість контрагента на ринку. До організаційних факторів можна віднести якість бухгалтерського та управлінського обліку покупця; віддаленість господарчого суб'єкта; організаційної структури контрагента. Вплив вищезазначених економічних та організаційних факторів мікросередовища пов'язаний із факторами вищого рівня – макросередовища (*Sinevičienė, 2016*).

Серед внутрішніх факторів виділяно теж дві групи: економічні та організаційні. До внутрішніх економічних факторів відносено фінансову та економічну стратегію підприємства; фінансовий стан підприємства; структуру дебіторської заборгованості; можливості використання негрошових способів ліквідації дебіторської заборгованості; кількість дебіторів. Серед внутрішніх організаційних факторів також можна виокремити структуру підприємства, організацію управлінського та бухгалтерського обліку; кваліфікованість співробітників.

Отже, система факторів узагальнена, структурована та досліджено зміст окремих факторів впливу на якість управління дебіторською заборгованістю. В цій системі провідна роль належить економічним факторам макроекономічного походження. Вважаємо, що вплив цих факторів має як якійсний, так і кількісний характер та може бути кількісно виражений.

4.3. Модель кількісної оцінки факторів впливу на якість управління дебіторською заборгованістю

Враховуючи показники фінансової стійкості та деталізовані фактори різних рівнів, що впливають на рівень дебіторської заборгованості, та базуючись на тезі, що вплив означених факторів можна кількісно оцінити, авторами даного дослідження запропоновано та графічно відображено модель кількісної оцінки факторів впливу на якість управління дебіторською заборгованістю підприємств оптової торгівлі (*рис. А.1*).

Розроблена модель – дворівнева. Призначення цієї математичної моделі – описувати взаємодію всіх груп факторів. Перший рівень відображає зв'язок стану боргових відносин між підприємствами і факторів макросередовища, які його обумовлюють. Другий рівень відображає зв'язок якості дебіторської заборгованості окремого підприємства і факторів мікросередовища. Показники факторів макрорівня отримують із офіційних статистичних джерел; показники факторів мікрорівня розраховують за обліковими даними підприємств.

5. Висновки

Аналіз і перелік факторів впливу на динаміку та структурні зміни дебіторської заборгованості запропоновано здійснювати, зважаючи на якість дебіторської заборгованості за роботи, товари, послуги. Визначені показники основних факторів впливу на динаміку та якість дебіторської заборгованості. Показником якості вважається частка прострочених боргів у загальному обсязі дебіторської заборгованості підприємства.

Фактори впливу на динаміку і якість дебіторської заборгованості науково обґрунтовано і запропоновано розглядати на мікро- та макрорівнях. Удосконалено систему факторів, де головна роль належить економічним факторам. Завдяки неведеній дворівневій математичній моделі їх вплив можна оцінити кількісно.

Пропозиції, викладені у роботі, можуть бути застосовані виробничими підприємствами та підприємствами оптової торгівлі в процесі формування політики управління дебіторською заборгованістю.

6. Фінансування

Це дослідження не отримало конкретної фінансової підтримки.

7. Конкуруючі інтереси

Автори заявляють, що у них немає конкуруючих інтересів.

References

Aggarwal, K., & Tyagi, A. K. (2018). Inventory and credit decisions under inflationary conditions with inflation induced bad-debts. *International Journal of Operations Research and Information Systems,* 9(3), 52-76. doi:10.4018/ijoris.2018070103.

Bei, Z., & Wijewardana, W. (2012). Financial leverage, firm growth and financial strength in the listed companies in Sri Lanka. *Procedia - Social and Behavioral Sciences, 40*, 709-715. doi:10.1016/j.sbspro.2012.03.253.

Belozertsev, V. S. (2012). Kontseptsiya upravlinnya debitors'koyu zaborhovanistyu pidpryyemstv optovoyi torhivli [Wholesale Debt Management Debt Management Concept], *Materiali za VIII Mezhdunarodna nauchna praktichna konferentsiya*, 17–25 yuni 2012, (2), 19-21. Available at: http://www.economy.nayka.com.ua/?op=1&z=1839 (in Ukrainian).

Belozertsev, V. S., & Gunya, V. O. (2014). Rozrobka mekhanizmu upravlinnya debitors'koyu zaborgovanistyu pidpriemstva: kontseptual'niy pidkhid [Development of a mechanism for managing accounts receivable: a conceptual approach]. *Ekonomist*, 3, 57–60. Available at: http://ua-ekonomist.com/7646-rozrobka-mehanzmu-upravlnnya-debtorskoyu-zaborgovanstyu-pdpriyemstva-konceptualniy-pdhd.html (in Ukrainian).

Blank, I. A. (2011). *Upravlenie finansovymi resursami predpriyatiya* [Management of financial resources of the enterprise]. K.: El'ga (in Russian).

Coibion, O., Gorodnichenko, Y., & Ropele, T. (2019). Inflation expectations and firm decisions: New causal evidence. *The Quarterly Journal of Economics,* 135(1), 165-219. doi:10.1093/qje/qjz029.

Dolgikh, Y., Panfilova, E., & Smorodina, E. (2020). Digital technologies in ensuring financial strength of Russian non-ferrous smelters. *Proceedings of the 2nd International Scientific and Practical Conference "Modern Management Trends and the Digital Economy: From Regional Development to Global Economic Growth" (MTDE 2020)*. doi:10.2991/aebmr.k.200502.128.

Financial Strength and Linkages with Liquidity. (2015). *The handbook of global corporate treasury,* 169-194. doi:10.1002/9781119199243.ch12.

Frennea, C., Han, K., & Mittal, V. (2019). Value appropriation and firm shareholder value: role of advertising and receivables management. *Journal of Marketing Research,* 56(2), 291-309. doi:10.1177/0022243718822506.

Giedt, J. Z. (2018). modelling receivables and deferred revenues to detect revenue management. *Abacus, 54*(2), 181-209. doi:10.1111/abac.12119.

Inessa, S., Artem, S., & Wielki, J. (2019). Analysis of macroeconomic factors affecting the investment potential of an enterprise. *European Research Studies Journal, XXII*(Issue 4), 140-167. doi:10.35808/ersj/1503.

Karadağ, H. (2018). Cash, receivables and inventory management practices in small enterprises: Their associations with financial performance and competitiveness. *Small Enterprise Research, 25*(1), 69-89. doi:10.1080/13215906.2018.1428912.

Karpenko, O. A., Karpova, D. P., Grigorieva, E. M., Savenkova, E. V., & Guirinskiy, A. V. (2017). The empirical study of the efficiency of the impact of macroeconomic variables on national currency. *Efficiency in Business and Economics Springer Proceedings in Business and Economics,* 81-87. doi:10.1007/978-3-319-68285-3_7.

Klimova, O. (2017). Receivables management features of engineering enterprises. *SSRN Electronic Journal*. doi:10.2139/ssrn.2971094.

Kozka, A. (2010). Yeshche raz o dolgakh, ili kak odolet' debitora [Once again about debts, or how to overcome a debtor]. *General manager, 8*(84), 40-45 (in Russian).

Krylov, S. (2020). Information and accounting support for accounts receivable management. *SSRN Electronic Journal*. doi:10.2139/ssrn.3635413.

Kumsta, R., & Vivian, A. (2019). The financial strength anomaly in the UK: Information uncertainty or liquidity? *The European Journal of Finance, 26*(10), 925-957. doi:10.1080/1351847x.2019.1641532.

Lishchenko, O. G., & Beskosta, G. M. (2012). Analiz debitors'koji zaborgovanosti v sistemi upravlinnya pidpriemstvom [Analysis of accounts receivable in the enterprise management system]. *Derzhava ta regioni. Seriya: Ekonomika ta pidpriemnitstvo*, *1*, 114–117. doi:10.31558/2307-2296.2019.1.10 (in Ukrainian).

Oladnichuk, N. V., Konzeba, S. M., & Podlubna, O. D. (2019). Receivables accounting: the problems and the ways to solve them. *Herald of Kiev Institute of Business and Technology, 42*(4), 64-68. doi:10.37203/kibit.2019.42.10.

Purwanti, T. (2019). An analysis of cash and receivables turnover effect towards company profitability. *International Journal of Seocology, 1*(01), 37-44. doi:10.29040/seocology.v1i01.6.

Sági, J., Chandler, N., & Lentner, C. (2020). Family businesses and predictability of financial strength: A Hungarian study. *Problems and Perspectives in Management, 18*(2), 476-489. doi:10.21511/ppm.18(2).2020.39.

Siekelova, A., Kliestik, T., Svabova, L., Androniceanu, A., & Schönfeld, J. (2017). Receivables management: The importance of financial indicators in assessing the creditworthiness. *Polish Journal of Management Studies, 15*(2), 217-228. doi:10.17512/pjms.2017.15.2.20.

Sinevičienė, L. (2016). Tax burden and economic development: The case of the European Union countries. *Entrepreneurship, Business and Economics - Vol. 2 Eurasian Studies in Business and Economics,* 283-298. doi:10.1007/978-3-319-27573-4_19.

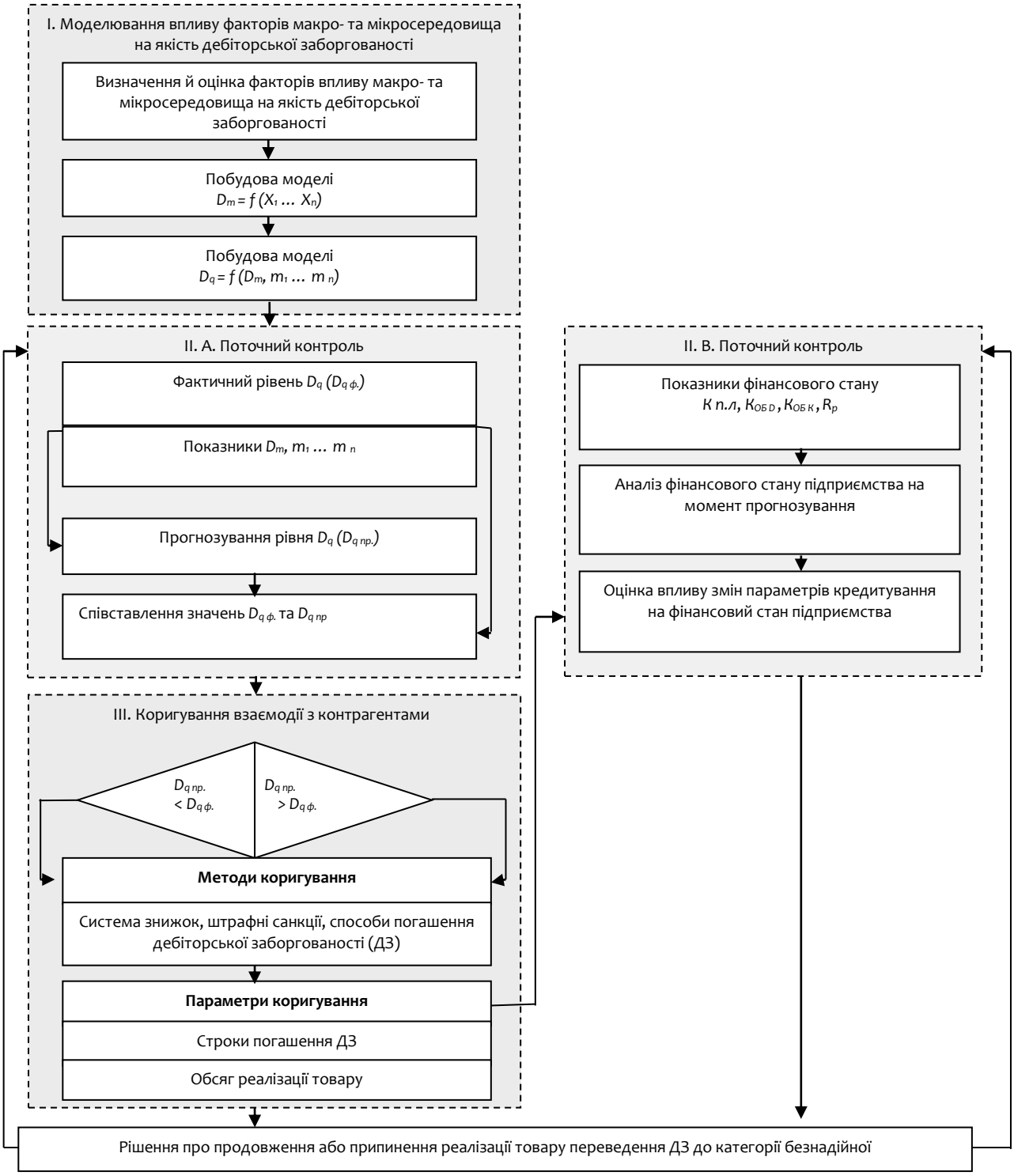
Stam, N., & Westerman, W. (2018). Accounts receivable overdue and market dynamics: A case study. *The Central European Review of Economics and Management, 2*(3), 5. doi:10.29015/cerem.678.

Tacchella, A., Mazzilli, D., & Pietronero, L. (2018). A dynamical systems approach to gross domestic product forecasting. *Nature Physics, 14*(8), 861-865. doi:10.1038/s41567-018-0204-y

Volnin, V. A. (2010). Kreditnaya politika predpriyatiya: perekhod k sistemnomu upravleniyu [Credit policy of the enterprise: transition to system management]. *Vestnik: finansy, nalogi, ctrakhovaniye, bukhgalterskiy uchet*,5,21-22 (in Ukrainian).

Zimon, G. (2018). Strategies of receivables management in multi-entity organizations. *Proceedings of the Third International Conference on Economic and Business Management (FEBM 2018)*. doi:10.2991/febm-18.2018.2.

Додаток А: Модель кількісної оцінки



Dq – якість дебіторської заборгованості; D_m – показник стану боргових відносин між підприємствами України; $K\,п.л$ – коефіцієнт поточної ліквідності; $K_{ОБ\,D}$ – коефіцієнт оборотності дебіторської заборгованості за товари; $K_{ОБ\,К}$ – коефіцієнт оборотності кредиторської заборгованості за товари; *Rp* – прибутковість кредитних операцій.

Рисунок А.1: Модель кількісної оцінки факторів впливу на якість управління дебіторською заборгованістю підприємств оптової торгівлі*

**Джерело*: розроблено авторами.

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Influence of infrastructure financing on financial sustainability of water service providers in Kenya

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Purpose. To establish the influence of infrastructure financing on financial sustainability of water service providers (WSPs) in Kenya.

Design/Method/Research approach. The study adopted the pragmatism research philosophy and an explanatory sequential mixed design targeting some senior managers selected from the eighty-eight registered WSPs in Kenya. A structured questionnaire was used to collect the quantitative data while an interview schedule was used to collect the qualitative data from key informants. The data analysis was done on the bases of descriptive and inferential statistics; the nature and size of relationship was tested using correlation and the regression analysis while the results are presented using tables and graphs.

Findings. The study concludes that Infrastructure financing has a positive and statistically significant influence on financial sustainability of WSPs in Kenya.

Theoretical implications. The research proves that infrastructure financing has a statistically significant effect on financial sustainability of WSPs in Kenya.

Practical implications. Taking into account the findings, it is recommended that the National government via the National treasury and WWDAs should ensure that all funding proposals capture end-to-end financing so as to increase the last mile connectivity.

Social implications. The study also identifies the need for the Ministry of Water, Sanitation and Irrigation (MWSI) to collaborate with key stakeholders in order to tap into local resources and development grants.

Originality/Value. The study makes a unique contribution by establishing that infrastructure financing significantly influences financial sustainability of water service providers in Kenya.

Research limitations/Future research. There is need to explore the possibility partnerships with communities and NGOs as the sector is highly indebted and unable to service the current loan portfolio.

Paper type. Empirical.

Keywords: financial sustainability; infrastructure deficit; water; last mile connectivity; stakeholders.

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Вплив фінансування інфраструктури на фінансову стійкість постачальників послуг з водопостачання в Кенії

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Мета роботи. Встановити вплив фінансування інфраструктури на фінансову стійкість постачальників водних послуг (ПВП) у Кенії.

Дизайн/Метод/План дослідження. Застосовано філософію прагматичних досліджень і пояснювальне послідовне змішане проектування, що націлені на керівників вищого рівня серед вісімдесяти восьми зареєстрованих ПВП у Кенії. Для збору кількісних даних застосовано структурований опитувальник, для збору якісних даних від ключових інформаторів проведено співбесіди. Аналіз даних проведено на основі описової та інференційної статистики; характер і розмір взаємозв'язку перевірено за допомогою кореляційного та регресійного аналізу, результати представлені у вигляді таблиць та графіків.

Результати дослідження. Проведений аналіз дозволяє стверджувати, що фінансування інфраструктури має позитивний та статистично значущий вплив на фінансову стійкість ПВП у Кенії.

Теоретичне значення дослідження. Дослідженням доведено, що фінансування інфраструктури має статистично значущий вплив на фінансову стійкість ПВП в Кенії.

Практичне значення дослідження. Беручи до уваги висновки, національному уряду рекомендовано забезпечити процес, щоб всі пропозиції щодо фінансування охоплювало наскрізне фінансування, а також збільшення підключення до «останньої милі» через Національну скарбницю та агенцію з розвитку водних робіт.

Соціальне значення дослідження. Визначено потребу Міністерства води, санітарії та зрошення (MWSI) в розширенні співпраці з ключовими стейкхолдерами з метою використання місцевих ресурсів і грантів на розвиток.

Оригінальність/Цінність/Наукова новизна дослідження. Встановлено, що фінансування інфраструктури істотно впливає на фінансову стійкість постачальників послуг водопостачання в Кенії.

Обмеження дослідження/Перспективи подальших досліджень. Потрібно вивчити можливість партнерства з громадами та неурядовими організаціями, оскільки цей сектор має велику заборгованість і не може обслуговувати поточний кредитний портфель.

Тип статті. Емпіричний.

Ключові слова: фінансова стійкість; дефіцит інфраструктури; вода; last mile connectivity; зацікавлені сторони.

Влияние финансирования инфраструктуры на финансовую устойчивость поставщиков услуг водоснабжения в Кении

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Цель работы. Установить влияние финансирования инфраструктуры на финансовую устойчивость поставщиков водных услуг (ПВУ) в Кении.

Дизайн/Метод/План исследования. Использованы философия прагматических исследований и объяснительное последовательное смешанное проектирование, нацеленные на руководителей высшего уровня среди восьмидесяти восьми зарегистрированных ПВУ в Кении. Для сбора количественных данных применен структурированный опросник, для сбора качественных данных от ключевых информаторов проведены собеседования. Анализ данных проводился на основе описательной и инференционной статистики; характер и размер взаимосвязи проверялся с помощью корреляционного и регрессионного анализа, тогда как результаты представлены в виде таблиц и графиков.

Результаты исследования: Проведенный анализ позволяет утверждать, что финансирование инфраструктуры имеет положительное и статистически значимое влияние на финансовую устойчивость ПВУ в Кении.

Теоретическое значение исследования. Доказано, что финансовая устойчивость ПВУ в Кении существенно зависит от финансирования инфраструктуры.

Практическое значение исследования. Учитывая результаты исследования, национальному правительству рекомендуется обеспечить процесс, чтобы все предложения по финансированию охватывало сквозное финансирования, а также увеличение подключения к «последней мили» через Национальную казну и агентства по развитию гидротехнических сооружений.

Социальное значение исследования. Определена потребность Министерства воды, санитарии и орошения (MWSI) в расширении сотрудничества с ключевыми стейкхолдерами с целью использования местных ресурсов и грантов на развитие.

Оригинальность/Ценность/Научная новизна исследования. Исследование делает уникальный вклад, установив, что финансирование инфраструктуры существенно влияет на финансовую устойчивость поставщиков услуг водоснабжения в Кении.

Оригинальность/Ценность/Научная новизна исследования. Необходимо изучить возможности партнерства с общинами и неправительственными организациями, поскольку этот сектор имеет большую задолженность и не может обслуживать текущий кредитный портфель.

Тип статьи. Эмпирический.

Ключевые слова: финансовая устойчивость; дефицит инфраструктуры; вода; last mile connectivity; заинтересованные стороны.

1. Introduction

Globally, water is considered a basic human right, a key input in the industrial and commercial sectors as well as a major contributor to economic development *(Montgomery, Bartram, & Elimelech, 2009; Chitonge, 2010; Tsitsifli et al., 2017)*. It is also considered a source of life for all living things, it is a medium of transport, a key input in agricultural production, a solvent and a temperature regulator *(Aung, Jiang, & He, 2018; Martínez-fernández, Neto, Hernández-Mora, Del Mora, & La Roca, 2020)*. This recognition contributed towards the push for efficiency, public participation, accountability and financial stewardship in the provision of water *(Langford, 2005; Means, Ospina, & Patrick, 2005)*. In the process, water was eventually important under the UN Millennium Development Goals (MDGs) with the objective of reducing by half the population without access to water and basic sanitation *(Hering et al., 2015; Lester & Rhiney, 2018)*. The focus was turned towards increased investment in the sector aimed at improving access to water across the globe *(UNICEF & World Health Organization, 2015)*.

Under the Sustainable Development Goals (SDGs), economies, sought to track the broader aspects of water service provision including access, quality, efficiency, integrated management, transboundary cooperation and public participation *(Ait-Kadi, 2016)*. The SDGs also put more emphasis on financial sustainability in the provision of the various aspects of water *(Satterthwaite, 2016)*. The need for sustainability, emanated from the fact that, some countries reported regressive access rates as of the end-term review of MDGs (*Satterthwaite, 2016*).

As a result, within the SDG, the economies under SDG 6, committed towards addressing accessibility and sustainability of water management for all by the year 2030 as provided for under the sustainable development goal number six *(Satterthwaite, 2016; Alaerts, 2019)*. Despite the commitment to increase global access to water and sanitation, the access rates in Kenya have remained very low, 59% and 17% and with annual growth rates of 0.9% and 0.2% for water and sewerage respectively (*WASREB, 2020*). *Fig. 1* shows the water and sewerage coverage over the period.

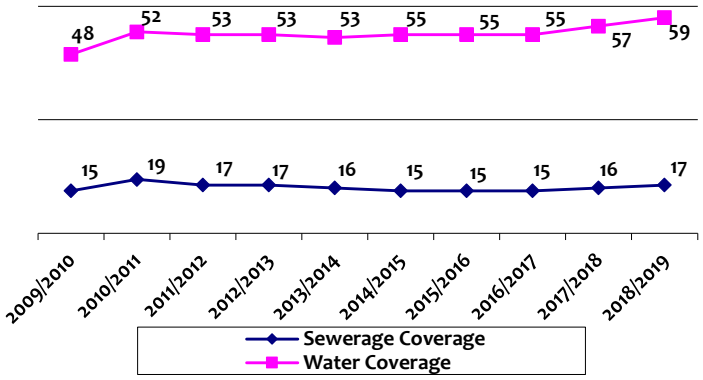

Figure 1: Water and Sewerage coverage, 2009-2019, %*

**Source:* compiled by the author based on *WASREB (2020)*.

Financial sustainability in water service provision is not only important in ensuring universal access to water, but also a major consideration by development partners interested in financing the sector (*Schwartz, Tutusaus, & Savelli, 2017*). The level of operation and management (O&M) cost recovery is an input in the assessment for credit worthiness of water service providers, while high levels of O&M cost coverage enables WSPs to have some retained earnings which can be utilized for extension and continuity of services provision (*Mitlin & Walnycki, 2019*). The need for realization of financial sustainability partly contributed towards the global move to commercialize water service provision in addition to realizing increasing access and equity in the 1990s (*Rusca & Schwartz, 2017*). The success of the push for financial sustainability through commercialization of water service provision is, however, yet to be ascertained because utilities across the globe continue to report a declining trend in O&M cost coverage *(Van den Berg & Danilenko, 2011)*. In a study by the World Bank to establish the performance levels for water and waste water utilities across the world, it was established that the global O&M cost coverage declined from 1.11 in 2000 to of 1.05 in 2008 (*VAN den Berg & Danilenko, 2011*). Similarly, O&M cost coverage in Sub-Saharan Africa declined from 1.26 in 1995 to 1.16 in 2009 *(Marson & Savin, 2015)*.

In Europe, a study covering 162 utilities across 4 countries established that the O&M cost coverage declined from 0.74 in 2007 to 0.66 in 2011 (*Tsagkaraki et al., 2014*). In Asia, a study by the Asian Development Bank (ADB) found out that cost recovery declined from 1.03 in 1995 to 0.89 in 2001 *(Asian Development Bank, 2004)*. The study covered 50 utilities in 34 ADB member countries (*Asian Development Bank, 2004)*. In addition to the declining financial sustainability trends, none of the countries has consistently attained the acceptable O&M cost coverage benchmarks which varies from 1.30 to 2.00 depending on the reference geographical area (*Marson & Savin, 2015*). In Kenya, the need to ensure sustainability of the water sector was initiated in the late 1990s by the government (*Van de Loo, 2011*). In the Sessional paper no. 1 of 1999, lack of attainment of full recovery by water utilities across the country was identified as a major setback to attainment of the MDGs (*GoK, 1999*). In the document, various challenges were identified including overreliance on public financing for operation and maintenance, fragmented management of the water schemes across the country, lack of a clear legal framework. Others were inadequate resources for network expansion and rehabilitation, cost insensitive tariffs, and uneven water resource distribution (*GoK, 1999*). The government proposed four key solutions including water resource conservation, supply of adequate quantities of good quality water and safe disposal of waste water, establishment of effective and efficient institutional framework, development of sound and sustainable financing mechanisms for the sector (*GoK, 1999*).

This was finally actioned through formulation and operationalization of the Kenya's Water Act 2002 *(Schwartz et al., 2017)*. In the Act, the government provided the legal framework necessary for the implementation of the strategies laid down under the sessional paper no. 1 of 1999 (*Rampa, 2011*). Institutional framework was created that separated policy, regulation, resource management and water service provision in order to foster financial sustainability of the sector (*Schwartz et al., 2017*). The Act became operational in March 2003 and the regulator started tracking the performance of the Water Service Providers (WSPs) from 2005/2006 financial year. Among the parameters that were tracked was the level of Operation and Management

(O&M) cost recovery as a key parameter for the financial sustainability. A WSP is assumed to have attained the financial sustainability once 150% O&M cost coverage is attained. Since its implementation, it is estimated that 99% of the WSPs in Kenya are yet to attain the set full cost recovery (FCR) level of 150% of O&M cost coverage (*WASREB, 2018*).

Inability to realize sustainability could be attributed to high levels of inefficiency, sub-optimal water pricing, overreliance on subsidies, failure to implement current technology in the management of water and low water coverage. For instance, according to the *EWFD* (*2000*), financial sustainability is influenced by pricing, efficiency, investment financing, asset management, subsidies, implementation of the right policies and public participation. This notwithstanding, however, there is limited current, empirical and domesticated research linking infrastructure financing to financial sustainability of WSPs. For instance, although governments have increased infrastructure financing to the water sector, it is worrying that the infrastructure financing gap continues to grow *(Wu, 2011; Unnerstall & Messner, 2015)*.

A few studies exist in terms of infrastructure financing, however, they focus on affordability at household level *(Montgomery et al., 2009)*. The few that have explored on infrastructure financing and financial sustainability at WSP level, only sought to quantify the financing gap (*Vučijak, Pašić, & Bijelonja, 2018*). Kenya's Vision 2030 envisages attainment of 100% coverage by the year 2030 and the estimated cost of the required new investment is Kshs 100 Billion annually against an available budget of Kshs 40 Billion annually (*WASREB, 2019*). Whereas investments in the sector have been envisaged, the issues of how sustainability will be realized in order to assure realization and continuity in the realization of the policy pronouncements, remain silent. There was therefore need to undertake a study aimed at establishing the influence of infrastructure financing on the financial sustainability of WSPs to inform policy discourse, debate and dialogue.

2. Theoretical background

Lack of universal coverage for water and sanitation assets continues to be a common problem for the sector primarily due to insufficient financing for new asset development and also to rehabilitate ageing ones *(Ruiters, 2013; Bhattacharya et al., 2012)*. Given the long repayment period and the low creditworthiness of water companies, the bigger financing for water and waste water assets continue to be from government budgets and to some extent concessional loans and grants (*Alaerts, 2019*). Despite the rising budgetary contributions from governments, the impact of such financing is minimal because the actual financial requirement is close to 500% of the current provision (*Alaerts, 2019*). This calls for diversification on the sources of financing and also for improvement of the WSP revenue earning capabilities to enable self-financing of infrastructure (*Alaerts, 2019*). Owing to the growing need for water infrastructure development and renewal, several studies have been undertaken in this area.

A global review that sought to find out the main sources of water infrastructure financing established that the choice of financing was informed by options available, the cost of financing and the credit rating (*Alaerts, 2019*). The study was undertaken using secondary data covering the years from 1990 to 2015 and projections for up to 2020. The results show that the richest countries financed their infrastructure development through the national budgetary provisions, while most developing countries financed their water infrastructure development through debt. Some rich countries like France, however, manage water through concessions in partnership with private players; England and Wales embraced full privatization while others like Philippines and China employed public–private partnerships in selected cities. Such arrangements are possible in rich economies because the sector is able to earn and collect enough to sustain itself.

Another major source of water financing in the developing nations is multilateral and bilateral financing usually advanced through the ministry of finance who then cushions the utilities from risks. While the public water sector in the developed nations has attracted commercial sector financing, it is still a rare occurrence among the developing nations. The good credit rating of public water utilities, stable markets, strong regulatory regime and convincing proposals are cited to have contributed to the attractiveness of public water utilities to commercial financing. The poor credit rating results from the inability of the water utilities to raise adequate funds to finance their operation and maintenance costs and loan repayment. This study used descriptive statistics due to the limitations presented by the available data with only trends and proportions being established. The study sought to explain the reason for the choice of financing as opposed to the influence of the financing on financial sustainability as is the case with the current study.

While some studies have been undertaken to find the motivation for adopting certain water infrastructure financing options, some studies undertaken on water infrastructure financing have sought to establish the various financing options adopted by different countries. In Japan, *Shibuya, Hernández-Sancho, & Molinos-Senante* (*2014*), sought to establish the status of water management across the country, and found that for the years between 1991 and 2010, the Municipal Bond redemption formed more than 50% for water service providers' financing, followed by subsides by local governments, subsidies by national government, contribution from customer revenues, and other sources respectively. This study was done through trend analysis and using data obtained through the Japan Water Works Association (JWWA) database. The study recommended that the tariff rates should be enhanced so that it covers all the developmental and asset renewal costs because of the continuously declining subsidies from both levels of the government *(Shibuya et al., 2014)*. The inability to raise adequate financing which would cover asset renewal costs was identified as a main cause of decreased efficiency levels which led to reduced cost coverage hence poor financial sustainability. This study failed to measure the size of influence because only the association of variables could be measured through trend analysis.

In West Virginian Municipalities, it was established that the preference for grant financing was informed by the additional loan repayment burden imposed on the water users in the case of loan financing (*Erfanian & Collins, 2018*). The study was undertaken to find out what informed water charges in West Virginia by utilizing secondary data collected from reports and the analysis was done using descriptive statistics and regression analysis. The results of the study showed that debt financing caused an increase in water charges by $2 for every 4,500 gallons which informed the recommendation that the investment in water infrastructure should be financed through grants as opposed to loans. The preference for grant financing was motivated by the desire to keep water prices at affordable levels *(Erfanian & Collins, 2018)*. Since not all countries have embraced full cost recovery pricing for water, this finding is considered applicable in the countries which allow water charges to include loan repayment. This study focused on the cost of access to water by customers and thus failed to link infrastructure financing to financial sustainability as is the case in the current one.

Similarly, a study undertaken in the United States to examine the impact of pay-go and debt infrastructure financing on the volatility of capital investment recommended the use of either of the two sources as guided by the economic performance of the country (*Wang & Hou, 2009*). The study reports that both cash-financing and debt-financing reduced capital expenditure volatility. According to this study, many states borrowed heavily in the 19th century in line with the Keynesian theory but defaulted to pay (*Wang & Hou, 2009*). The study was undertaken using panel data analysis, using a robust model to correct autocorrelation while fixed effects were used to take care of unobservable factors. The model regressed capital spending against the time

with an assumption that expenditure is randomly distributed around the trend line. The study recommended the use of more internal financing (pay-go) for infrastructure financing under normal circumstances and the use of debt during the economic downturn. This study used secondary data to find the relationship between infrastructure financing and financial sustainability while the current study uses primary data.

In order to find the optimal financing model for water infrastructure in South Africa, *Ruiters* (*2013*) undertook a study which identified several management challenges that led to water infrastructure investment gaps including: the economic feasibility of water infrastructure, lack of proper strategic planning, incomprehensive financing and economic analysis and sub-optimal pricing policies (*Ruiters, 2013*). The study was undertaken through surveys, interviews, review of reports, observations, focus group discussions and case studies. In South Africa, water infrastructure is majorly financed by the government grants as water pricing has continued to be charged either at or below marginal cost of supply and the deficit is covered by tax revenues (*Ruiters, 2013*). Although the country had other existing infrastructure financing options including: government through revenue fund, infrastructure grants (municipal and regional) and through water pricing; the study recommended the use of alternative financing models including: financial markets, public-private partnerships (PPPs), private sector markets, demand risk funding model and by approaching water infrastructure funding institutions (*Ruiters, 2013*). This study concentrated in identification of infrastructure financing gaps as opposed to assessing the influence of the financing on financial sustainability.

A follow-up study in South Africa revealed that the infrastructure development in south Africa was majorly financed though: water charges, guaranteed loans, government grants and donor grants (*Ruiters & Matji, 2015*). In the study which was done to offer a solution to the growing infrastructure financing gap. The data for this study was collected by using surveys, interviews, document review, observations, focus group discussions and case studies with a sample of 46 participants drawn from different institutions including: The National Treasury, water management institutions, Funding agencies, local government and municipalities. The analysis was undertaken by way of a scenario analysis with models considering different infrastructure financing mix. According to this study, South Africa's annual depreciation was estimated at R160 million, while the financing gap stood at R600 billion with an estimated resource infrastructure development cost of R66.3 billion. The deficit was attributed to: the inability of the Department of Water Affairs to raise commercial funding, inadequate maintenance of the existing infrastructure, and lack of implementation cost reflective tariffs, lack of integrated water management and being public sector driven there is a poor customer focus, and inability to retain appropriate skills. This study focused only on establishing the different financing model and its impact on the access to water without linking the financing models to the WSP's financial sustainability.

Unlike other countries which face an ever-growing water infrastructure financing gap, China is one of the countries that has managed to cover the infrastructure deficit (*Wang, Zhang, Zhang, & Zhao, 2011*). The results of a study undertaken to examine the impact of using unconventional water infrastructure financing in China, showed that such models led to revenue volatility for water utilities. The data used for the study was collected through a contextual review of the Chinese institutions and policies on urban infrastructure financing, and through interviewing relevant government officials; and analyzed using descriptive statistics inform of percentages. According to this study, there are two main financing sources: internal and external. Internal sources comprise of taxes, user charges and fees while external sources comprise of loans and grants. However, the government can transfer the burden on such investments by the use of Public Private Partnership (PPP) arrangements. Of the total financing the government sources funded up to 34%, water charges and fees accounted for about 2% of infrastructure financing while off-budget funding financed up to 58 % by year 2007. Even though other sources take up the highest infrastructure financing budget, they are volatile and therefore affect the revenue stability aspect of financial sustainability (*Wang et al., 2011*). The study focused on a review of the infrastructure financing based on secondary data which was analyzed using percentages unlike the current one which uses primary data analyzed using the descriptive and regression analysis. It also fails to link the infrastructure financing options to financial sustainability as is the case in the current study.

A global comparative study undertaken with an aim of establishing an acceptable leverage level for water utilities recommended a debt ratio of between 0.4 to 0.6 (*Hassanein & Khalifa, 2007*). The study was undertaken using ratio analysis including: current ratio, asset turnover, debt to equity ratio, return on sales, return on equity, and working ratio for water drawn from the USA, the UK, Egypt, Africa, South East Asia and Latin America (*Hassanein & Khalifa, 2007*). The results of the study on leverage levels were that, in the USA the debt-to-equity ratio amongst public utilities was found to be 0.58 and 0.71 for water only utilities and water and sewer utilities respectively, while for water only private utilities it was 1.2; in the UK the ratio amongst private water utilities was 0.49 and 0.67 for water only utilities and water and sewer utilities respectively. In Africa, for water only utilities the debt to ratio was 0.87, south East Asia had 0.09 and 0.51 for water only utilities and water and sewer utilities respectively. In Latin America, for water and sewer the ratio was 0.47 while in Egypt the debt-to-equity ratios were 0.85 and 0.31 for water only utilities and water and sewer utilities respectively. The recommended ratio is 0.4-0.6 indicating the high dependence on loan financing. Water and sewer utilities in the USA had a higher debt to equity ratio of 0.71. The inability to get data relating to similar reporting periods across the globe resulted in the analysis being undertaken on a non-uniform period; the inconsistency of the periods under investigation might have resulted in some discrepancies. Additionally, the study used the ratio analysis with the information drawn from financial statements; it is therefore prone to the weaknesses linked with the use of accounting estimates in financial reporting. It also fails to use sector-specific measures for the various variables under study as used in the current study.

In Ghana, a study on infrastructure financing established that water and sanitation infrastructure is majorly financed through user water charges through the establishment of a reserve fund which was set up in 1994 (*Badu, Edwards, Owusu-Manu, & Brown, 2012*). The data was collected through the use of structured interviews and a questionnaire given to infrastructure development agencies; the data was factor analyzed for reliability while the nature of relationships was determined using the mean and standard deviation (*Badu et al., 2012*). The financing model was found to be such that revolving fund amounts were invested in both treasury bills and high interest earning investments (*Badu et al., 2012*). Water price in Ghana was based on full cost recovery covering asset renewal, loans provisions and administrative costs. The study established that the water sector in Ghana was able to consistently raise adequate funds for the infrastructure development (*Badu et al., 2012*). The implementation of the full cost pricing was, however, accompanied by the rebates of up to 5% to cushion water users who are not able to pay (*Badu et al., 2012*). The results of this study support the use of own revenue generation in ensuring the revenue stability aspect of financial sustainability of water utilities. Compared to the current study, this study only shows relationships and fails to link infrastructure financing to cost recovery of water service providers.

In trying to establish the linkage between cost recovery and access to water, *Marson and Savin* (*2015*) undertook a study covering 225 urban centers in Africa. The data used from this study was obtained from IBNET and national reports; the analysis was undertaken through both ratio and panel data analysis using data ranging from 1995-2012, with data collected relating to 22 countries. The study hypothesized three possible relationships

between cost recovery and investment financing: high-cost recovery provides is own revenue for investment financing, it provides adequate support from grants and fiscal support, and finally it enables utilities to quickly meet the conditions precedent to grant and loan financing from donors. The results advocated to incorporation of the tariffs, taxes, and transfers otherwise known as 3T-infrastructure financing framework to enable financial sustainability *(Marson & Savin, 2015*). The study failed to provide an optimal mix of the 3Ts; it failed to show the influence of infrastructure financing on financial sustainability. Compared to the current study, this study used secondary data; it concentrated on urban centers neglecting the rural areas because of the possible lack of information and coverage while the current study used primary data collected from senior management for the WSPs across the country.

On community water project financing, a study undertaken in Tamil Nadu, India to find out how communities financed Rural water supply, established that the revenue raised by the community water supplies was inadequate to cover the operation and maintenance costs; there were no funds to extend the services and to rehabilitate an ageing infrastructure (*Ramesh, 2016*). The study interviewed a total of 255 water customers spread across 17 villages as a source of primary data. It also reviewed existing financial records in its attempt to establish the adequacy of the income generated from service provision to finance operation and maintenance costs. Revenue variability was examined to assess if the revenue earned was either equal or greater than the budgeted amounts; the results showed that the actual revenue was lower than the budgeted amounts across all the villages under study (*Ramesh, 2016*). Whilst, the villages never achieved their revenue targets, their costs remained within the budget which impaired their cost recovery and their ability to finance infrastructure development for a majority of them (*Ramesh, 2016*). This study focused on the rural water supplies and incorporated water users in the survey while the current one focused on water utilities. In a study that sought to find out whether the Kenya's legal framework created an enabling environment for infrastructure financing, it was established there was need to explore innovative sources of financing like PPPs, concessions and *(Mureithi, Luwesi, Mutiso, Förch, & Nkpeebo, 2018*). The study used the trend analysis of the infrastructure financing in use by the sector, together with the financing need identification for all the entities in the sector and review of the legal framework while the results were presented using charts (*Mureithi et al., 2018*). This study failed to link the influence of infrastructure financing to financial sustainability because it concentrated on establishing the gap and linking it to the legal framework. In Kenya, *Mburung'a* (*2018*) undertook a study to assess the possible influence of capital structure on the sustainability of community water projects in Kieni constituency. The results showed that the source of infrastructure financing affects the sustainability of the water projects (*Mburung'a, 2018)*. The data was collected through questionnaires, interviews and observations from a sample size of 466 respondents distributed as follows: 382 community water project beneficiaries, 73 community water project chairmen, two district water officers and 9 bank managers. The data was analyzed using analysis of variance (ANOVA) and linear regression. It was established that there was a positive relationship between equity and internally generated revenue while there was a negative relationship between grant financing and the sustainability of the community water projects (*Mburung'a, 2018*). This study has limited geographical and institutional scope whereby it is limited to just a single constituency and to community water projects which are privately managed with minimal regulation, this may limit the ability to generalize the findings especially among regulated WSPs. Compared to the current study, it had a limited geographical scope, a constituency, and also targeted water users for the survey unlike the current which targets the water utilities spread across the country.A lot of studies have concentrated on identification of the financing gaps facing water utilities and also their current indebtedness *(Hassanein & Khalifa, 2007*); others have concentrated on the effects of infrastructure financing on the cost of water at house hold level (*Ramesh, 2016*); the few studies which linked infrastructure financing and financial sustainability were done in other countries *(Wang et al., 2011)* or had limited geographical scope (*Mburung'a, 2018*). Thus, there is limited research linking the infrastructure financing and financial sustainability of WSPs in Kenya.

3. Problem statement and Hypothesis

The purpose of this study is to establish the influence of infrastructure financing on financial sustainability of water service providers (WSPs) in Kenya.

Hence the hypothesis that:

H0: Infrastructure financing has no influence on the financial sustainability of water service providers in Kenya.

4. Methodology and data sources of research

This study was anchored on pragmatism philosophy since the researcher was interested in providing empirical based solutions to the financial sustainability concerns among the water service providers in Kenya (*Parvaiz, Mufti, & Wahab, 2016*). The study used mixed methods of data collection whereby quantitative data was collected from WSPs and qualitative data was collected from the water services regulator, water works development agencies and from the policy makers (*Creswell, 2014*). An explanatory sequential mixed design was used whereby; quantitative data was collected and analyzed, followed by qualitative data collection and analysis (*Creswell, 2014*). A mixed research design has been extolled for its ability to tap into the strengths of both the qualitative and quantitative data resulting in a better study (*Creswell, 2014*). It enables an in-depth understanding of the phenomenon being studied (*Leavy, 2017)*.

The target population for the quantitative data comprised of the seven senior managers from each of the eighty-eight registered WSPs, the specific respondents were as presented by *Tab. 1*:

Table 1: The Sample Size for Quantitative Data

Job Title	Sample size
1. Managing Directors	88
2. Manager, Finance and Accounts	88
3. Manager, Commercial Department	88
4. Manager, Technical Department	88
Total	*352*

***Source:** compiled by the authors.

The respondents were identified through multi-stage sampling whereby census sampling was used to identify the WSPs followed by purposive sampling to identify the managers responsible for the variables under study. The target population for the qualitative data comprised of the CEOs from WASREB representing the regulator and all water works development agencies (WWDAs) as the sector asset developers. The Principal Secretary and/or Water Secretary from the Ministry of Water, Sanitation and Irrigation (MWSI) were the policy makers. Purposive sampling was used to identify one participant from each of the participating organization category. The quantitative data was obtained through self-administered structured questionnaires, using the constructs developed from the Water Service Provider Toolkit for Commercial Financing of the Water and Sanitation Sector in Kenya and the Financial Sustainability Rating Tool for Urban Water Systems (*Hoffjan, Federico, Liserra, & Müller, 2014; World Bank Group, 2015*); the qualitative data was undertaken through interviews with industry experts drawn from the MWSI, WASREB and WWDAs.

The data collected was cleaned, coded and analyzed to obtain both descriptive and inferential statistics. Descriptive statistics included mean scores and standard deviation, charts, among others. Inferential statistics included statistical tests (normality, linearity, normality, correlation analysis), regression analysis and analysis of variance (ANOVA) aimed at establishing the nature and the magnitude of hypothesized relationships. In the regression analysis, the relationship was considered statistically significant if the P-value was ≤ 0.05. Prior to undertaking inferential analysis, diagnostic tests for normality, linearity and to rule out heteroscedasticity and multicollinearity were done; while factor analysis was done to establish the adequacy of the sample in explaining the relationship.

5. Research results

5.1. Reliability, response rate and other generalized tests

5.1.1. Reliability test

The reliability of the structured questionnaire was measured using a Cronbach's alpha so as to demonstrate whether the tests and scales constructed were fit for the research purposes. According to *Taber* (*2018*), a Cronbach's alpha of between 0.45 and 0.98 is acceptable. *Tab. 2* illustrates the reliability results of the questionnaire.

Table 2: Reliability Statistics*

Variable	Cronbach's Alpha	*N* of Items	Reliability
Infrastructure financing	0.836	20	Acceptable

*__Source:__ compiled by the authors.

The results in *Tab. 1* indicate that the Cronbach Alpha was 0.836, denoting the reliability of the questionnaire in relation to infrastructure financing.

5.1.2. Response rate

The analysis of the response rate is presented in *Tab. 3*.

Table 3: Response Rate*

Response Rate	Frequency	Percentage
Returned	252	71.59
Not returned	100	28.41
Issued	*352*	*100.00*

*__Source:__ compiled by the authors.

Out of 352 questionnaires that were administered to the respondents, 252 of them were returned for the analysis which translates to 71.59 percent return rate of the respondents. In overall, the response rate was considered high and sufficient for the study (*Baruch & Holtom, 2008*).

5.1.3. Job title of the respondents

The department and job title of an employee was sought in the study. *Tab. 4* provides a summary of positions of the respondents.

The results in *Tab. 4* show that the majority of the respondents (79.4%) were from finance and accounts followed by commercial managers (7.9%), managing directors (4.8%), technical managers (1.6%), while the remaining 6.3%, did not specify the job titles.

Table 4: Job Title of the Respondents*

Job Title	Frequency	Percentage
Finance Manager	200	79.4
Technical Manager	4	1.6
Managing Director	12	4.8
Commercial Manager	20	7.9
Job title not disclosed	16	6.3
Total	*252*	*100*

*__Source:__ compiled by the authors.

These results indicate that the majority of the respondents in this study were in senior management. It was therefore a considered opinion that the respondents were able to articulate the issues relating to the WSP financial sustainability.

5.1.4. Gender of the respondents

Gender is assumed to influence decision making and thus overall company's performance on financial sustainability. *Fig. 2* presents the gender of the respondents.

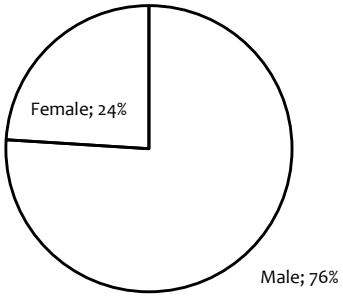

Figure 2: Gender of the Respondents*

*__Source:__ compiled by the authors.

The results in *Fig. 2* show that majority of the respondents (76%) were male, while 24% were female. This indicates that there are more male compared to female involved in financial management and decision making across the water service providers.

5.1.5. Education of the respondents

The level of education was important in this study because it enabled the researcher to confirm if the respondents understood the concepts that were being evaluated by the tool. *Tab. 5* gives the results of the respondents' education level.

Table 5: Education of the Respondents*

Education	Frequency	Percentage
Certificate/Diploma	12	4.8
Degree	172	68.3
Masters	68	27.0
Total	*252*	*100.0*

*__Source:__ compiled by the authors.

The results reveal that 95.3% of the respondents had Bachelor's degree and above, while 4.8 % had a Certificate/Diploma. It was considered that majority of the respondents could understand the concepts being evaluated thus increasing the reliability of their responses (*Tourangeau, Yan, & Sun, 2020*).

5.1.6. Years worked in the company

The study sought to understand the length of time the respondents had worked for the particular water service provider.

The period is considered important because it is an indication of how well the respondent understands the company. The respondents' length of time working in the firm is also associated with knowledge and experience of the issues at hand and thus helps in improving the overall company's experience.

Fig. 3 gives a breakdown number of years the respondents had served in the particular companies.

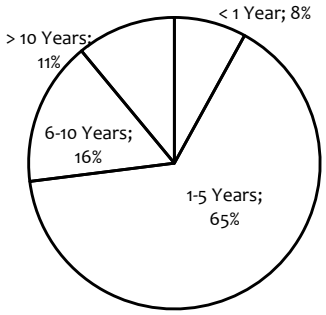

Figure 3: Years worked in the company*

Source: compiled by the authors.

In terms of years worked in the respective organization, 8% had worked for less than one year, 65% worked for between one to five years, while 16% and 11% had worked between six to 10 years, and over ten years, respectively. Given the statistics, there is an indication that the respondents had some understanding of the operations of the company and could therefore be able to provide necessary information on the subject matter.

5.1.7. Years worked in water sector

The respondents' experience in the sector was found important in this study because it gives an indication of how well one understands the sector. *Fig. 4* gives the breakdown of the years served in the sector:

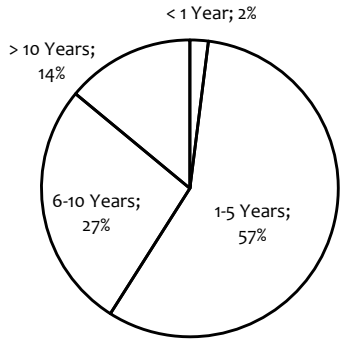

Figure 4: Years worked in water sector*

Source: compiled by the authors.

The results indicate that the respondents had worked in the water sector for less than one year (2%), between one to five years (57%), between six to ten years (27%) and for over ten years (14%). These results indicate a mix in terms of sectorial experiences implying that their contributions on the various issues represent the sectorial views.

5.1.8. Category of the company

This study sought to understand the category of the water service providers under study because that would be considered an important aspect when determining the financial sustainability of the company. The results were presented by *Fig. 5*.

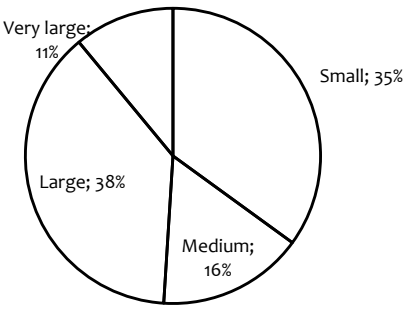

Figure 5: Category of the company*

Source: compiled by the authors.

Fig. 5 shows that 34.9% of the respondents constituted small WSPs, 15.9%, medium WSPs, while 38.1% and 11.1% were from large and very large WSPs, respectively. The findings show adequate representation for WSPs under the four categories. The representation from the various categories is critical since it is expected that their operational environment varies with the company size.

5.1.8. Billable Service

The study sought to establish the services offered by the various WSPs because diversity means more sources of revenue which would be expected to enhance the financial sustainability of the company. *Tab. 6* presents the analysis of the results.

Table 6: Billable service by the Company*

Billable service	Frequency	Percentage
Water only	84	33.3
Water and sanitation	28	11.1
Water, sanitation and sewerage	116	46.0
Water, sanitation and others	24	9.5
Total	252	100.0

Source: compiled by the authors.

The results show (*Tab. 6*) that 33.3% of the respondents provided water services only, 11.1% provided water and sanitation, 46% provided water, sanitation and sewerage while 9.5% provided water, sanitation and others (9.5%).

5.2. Descriptive statistics for infrastructure financing and financial sustainability

To determine the extent to which infrastructure financing influenced the financial sustainability of WSPs in Kenya, the respondents were required to rate several statements based on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Tab. 7 presents the results of the descriptive analysis tabulated in percentages, means and standard deviations.

The average mean was 3.95 with a standard deviation of 0.984. The statement with the highest mean was 'Lack of infrastructure development funds limits the company's access to the benefits of economies of scale' (*M*=4.60, *SD*= 0.552).

The other statements got the following means and standard deviations in a descending order: The revenue earned per year is not adequate for all the annual planned investments (*M*=4.42, *SD*=0.925); Given the competing needs, water infrastructure financing receives less attention at the county government level (*M*=4.26, *SD*=0.896).

Table 7: Means and standard deviations for infrastructure financing and financial sustainability*

	N	Mean	*SD*
The revenue earned per year is not adequate for all the annual planned investments	252	4.42	0.925
Lack of infrastructure development funds limits the company's access to the benefits of economies of scale	252	4.60	0.552
Given the competing needs, water infrastructure financing receives less attention at the county government level	252	4.26	0.896
The prerequisite conditions for loan financing from development partners limits the WSP ability to access such funds for asset development	252	3.79	1.049
The source of infrastructure financing affects the company's ability to break-even	252	3.52	1.186
Most of the new infrastructure being developed in the company's area of jurisdiction is funded through the loans from development partners	252	3.52	1.160
Lack of water and sanitation infrastructure ownership documents limits the ability to access loan financing	252	3.50	1.434
Financing infrastructure development through loans impairs the financial sustainability of WSPs	252	3.60	1.069
Partnerships like PPPs with beneficiary communities can greatly bridge the infrastructure financing gap being experienced by WSPs	252	4.10	0.654
On average, water infrastructure coverage has improved over the last 5 years	252	4.19	0.800
Average	252	3.95	0.984

*__Source:__ compiled by the authors.

On average, water infrastructure coverage has improved over the last 5 years (*M*=4.19, *SD*=0.800); Partnerships like PPPs with beneficiary communities can greatly bridge the infrastructure financing gap being experienced by WSPs (*M*=4.10, *SD*=0.654); The prerequisite conditions for loan financing from development partners limits the WSP ability to access such funds for asset development (*M*=3.79, *SD*=1.049); Financing infrastructure development through loans impairs the financial sustainability of WSPs (*M*=3.60, *SD*=1.069); Most of the new infrastructure being developed in the company's area of jurisdiction is funded through the loans from development partners (*M*=3.52, *SD*=1.160); The source of infrastructure financing affects the company's ability to break-even (*M*=3.52, *SD*=1.186) and finally 'Lack of water and sanitation infrastructure ownership documents limits the ability to access loan financing' had the lowest score of (M=3.50, *SD*=1.434).

5.3. Factor analysis for infrastructure financing and financial sustainability

Infrastructure Financing was measured using ten (10) items which were subjected to factor analysis in order to establish their adequacy in the measurement of the relationship. The factors are considered adequate if the KMO value>0.5. The results are presented by *Tab.* 8.

Table 8: KMO and Bartlett's test for infrastructure financing*

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.546
Bartlett's Test of Sphericity	Approx. Chi-Square	126.316
	df	187
	Sig.	0.000

*__Source:__ compiled by the authors.

The KMO value for the factors under infrastructure financing was 0.546 and Bartlett's test, x^2=126.316, *p*=0.000. These results confirmed the adequacy of the sample since *KMO*=0.546>0.5.

The study also carried out the Eigen values for the factors under infrastructure financing. The findings are shown in *Tab.* 9.

The findings revealed that the first four factors accounted for 65.960% of the variance in infrastructure financing.

The results from the scree plot indicated that the 4 components had Eigen values that were greater than 1. The results are shown in *Fig.* 6.

The findings support the total variance of explained results for infrastructure financing which implies that each successive factor accounts for smaller and smaller amounts of the total variance of explained results for infrastructure financing. Similarly, the study sought to find out the factor loadings for infrastructure financing. The findings are shown in *Tab. 10*.

The results show that lack of water and sanitation infrastructure ownership documents limits ability to access loan financing with the highest factor loading of 0.884 while 'revenue earned per year seems not adequate for all the annual planned investments' had the highest factor loading in the first component with 0.679.

5.4. Correlation analysis for financial sustainability and infrastructure financing

Pearson correlation was carried out to establish the association between infrastructure financing and financial sustainability. *Tab. 11* shows Pearson correlation (*r*=0.331).

This indicates a strong positive correlation between the infrastructure financing and financial sustainability indicating a positive association between the infrastructure financing and financial sustainability of WSPs in Kenya.

5.5. Regression analysis for influence of infrastructure financing on financial sustainability

In order to establish the influence of water pricing on financial sustainability, a regression analysis was done. The results of the analysis are presented in *Tab. 6-8.*

5.5.1. Model summary results for infrastructure financing and financial sustainability

Tab. 12 provides an R square of 0.11. This means that 11% of the financial sustainability is explained by variation in infrastructure financing.

5.5.2. ANOVA for infrastructure financing and financial sustainability

The analysis of variance was undertaken to establish if infrastructure financing was a good predictor of the financial sustainability among water service providers in Kenya.

Table 9: Total variance explained for infrastructure financing*

Component**	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.221	22.211	22.211	2.221	22.211	22.211	1.990	19.900	19.900
2	1.684	16.838	39.049	1.684	16.838	39.049	1.655	16.545	36.445
3	1.449	14.486	53.535	1.449	14.486	53.535	1.601	16.014	52.459
4	1.243	12.426	65.960	1.243	12.426	65.960	1.350	13.501	65.960
5	0.955	9.546	75.506						
6	0.739	7.395	82.901						
7	0.622	6.222	89.123						
8	0.543	5.429	94.552						
9	0.336	3.362	97.914						
10	0.209	2.086	100.000						

*__Source:__ compiled by the authors.
**__Note:__ extraction method is principal component analysis.

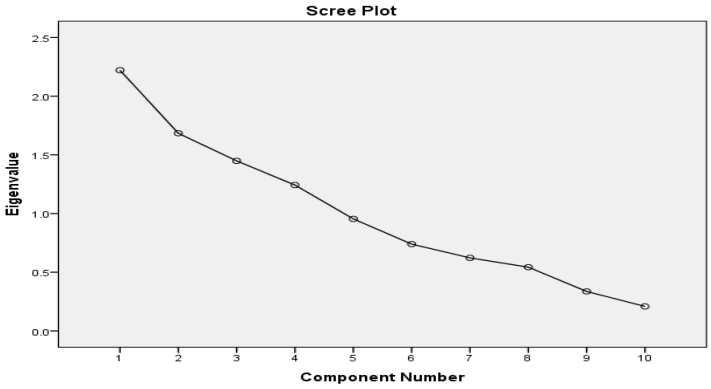

Figure 6: Scree plot for infrastructure financing*

*__Source:__ compiled by the authors.

Table 10: KMO matrix for infrastructure financing and financial sustainability*

Component Matrix[a]	Component**			
	1	2	3	4
The revenue earned per year is not adequate for all the annual planned investments	-0.291	0.679	0.368	0.130
Lack of infrastructure development funds limits the company's access to the benefits of economies of scale	0.117	0.329	-0.505	-0.642
Given the competing needs, water infrastructure financing receives less attention at the county government level	0.369	0.242		-0.566
The prerequisite conditions for loan financing from development partners limits the WSP ability to access such funds for asset development	0.499	-0.147	0.602	0.191
The source of infrastructure financing affects the company's ability to break-even	0.598	0.223	-0.360	
Most of the new infrastructure being developed in the company's area of jurisdiction is funded through the loans from development partners	0.636		-0.337	0.431
Lack of water and sanitation infrastructure ownership documents limits the ability to access loan financing	0.884	0.122		
Financing infrastructure development through loans impairs the financial sustainability of WSPs	0.327	0.498	0.600	-0.214
Partnerships like PPPs with beneficiary communities can greatly bridge the infrastructure financing gap being experienced by WSPs	-0.266	0.628	-0.176	0.263
On average, water infrastructure coverage has improved over the last 5 years	-0.128	0.570	-0.233	0.372

*__Source:__ compiled by the authors.
**__Note:__ extraction method is principal component analysis; 4 components extracted; a threshold of 0.1 was used in this study thus no component was dropped.

Table 11: Correlation analysis for infrastructure financing and financial sustainability*

		Financial sustainability	Infrastructure financing
Financial Sustainability	Pearson Correlation	1	0.331*
	Sig. (2-tailed)		0.010
	N	252	252
Infrastructure financing	Pearson Correlation	0.331**	1
	Sig. (2-tailed)	0.010	
	N	252	252

*__Source:__ compiled by the authors.
**__Note:__ correlation is significant at 0.05 level (2-tailed).

Table 12: Model summary for infrastructure financing and financial sustainability

Model	*R*	R square	Adjusted R square	Std. error of the estimate
1	0.331**	0.110	0.094	3.29898

*__Source:__ compiled by the authors.
**__Note:__ predictors are constant; infrastructure financing.

The control function was F>3.841, p≤0.05. *Tab. 13* provides the ANOVA results for infrastructure financing. The results indicate an *F*=7.020 (1,250df) and a p-value of 0.010>0.05. The critical value of *f-statistics* is (1,250df)=7,020<3,841, the value of *P*=0.01<0.05. This confirms that the model is a good fit and that infrastructure financing is a good predictor of the financial sustainability of WSPs in Kenya.

5.5.3. ANOVA for infrastructure financing and financial sustainability

The analysis of variance was undertaken to establish if infrastructure financing was a good predictor of the financial sustainability among water service providers in Kenya.

The control function was F>3.841, p≤0.05. *Tab. 13* provides the ANOVA results for infrastructure financing.The results indicate an F=7.020 (1,250df) and a p-value of 0.010>0.05. The critical f-statistic is at (1,250df) =7.020>3.841, P-value=0.01<0.05. This confirms that the model is a good fit and that infrastructure financing is a good predictor of the financial sustainability of WSPs in Kenya.

5.5.4. Regression coefficients for infrastructure financing and financial sustainability

The regression analysis yielded a regression coefficient of 0.262, with a p-value of 0.010<0.05 (*Tab. 14*).

5.5.5. Regression coefficients for infrastructure financing and financial sustainability

The regression analysis yielded a regression coefficient of 0.262, with a p-value of 0.010<0.05 (*Tab. 14*). Given that the model was tested at 5% level of significance, a *P-Value* of 0.01<0.05 suggests that there exists a statistically significant relationship between the infrastructure financing and financial sustainability of WSPs in Kenya whereby, a unit change in infrastructure financing leads to a 26.20% increase in the financial sustainability of water service providers in Kenya. Based on these findings, the study rejects the null hypothesis that states that Infrastructure financing has no influence on the financial sustainability of water service providers in Kenya and concludes that Infrastructure financing has a statistically significant influence on the financial sustainability of WSPs in Kenya. These results could be due to the fact that infrastructure financing increases access to water which in turn enhances revenue earning capacity of WSPs. Given the high infrastructure deficit in Kenya, an increase in infrastructure financing would increase water coverage which in turn enhances the WSP revenue earning capacity hence increases financial sustainability.

5.6. Interview analysis results on influence of infrastructure financing on financial sustainability

The interviewees confirmed that infrastructure financing is a major driver for financial sustainability of WSPs in Kenya. The infrastructure deficit is high and keeps increasing because WSPs are not in a position to fund the infrastructure development. The interviewees noted that in the period between 1990 and 2000, the infrastructure development was financed through communities and the NGOs and with minimal government or loan financing. According to the experts, the water sector reforms (2002) introduced overreliance on government and loan financing. They were, however, optimistic that the reforms did not erode the good spirit of partnership with the beneficiaries on small water projects and NGOs. The experts confirmed that there are still many stakeholders willing to partner with the water sector in-a-bid to finance water investment. The reason for the strong good will by stakeholders is because water is a key requirement in all sectors of the economy including health, agriculture, industry and commercial sectors.

Table 13: ANOVA results for infrastructure financing and financial sustainability*

Model**		Sum of squares	Df	Mean square	F	Sig.
1	Regression	76.399	1	76.399	7.020	0.010***
	Residual	620.347	250	10.883		
	Total	696.746	251			

*__Source:__ compiled by the authors.
**__Note:__ Dependent Variable: Financial Sustainability.
***__Note:__ predictors are constant; infrastructure financing.

Table 14: Regression coefficients for infrastructure financing and financial sustainability*

Model**		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. error	Beta		
1	(Constant)	34.208	3.905		8.760	0.000
	Infrastructure financing	0.262	0.099	0.331	2.650	0.010

*__Source:__ compiled by the authors.
**__Note:__ dependent variable is financial sustainability.

6. Conclusions and recommendations

6.1. Conclusions

This study indicates that infrastructure financing has a statistically significant influence on financial sustainability. The correlation analysis revealed that infrastructure financing is positively associated with financial sustainability while the regression analysis indicated that infrastructure financing has a statistically significant influence on the financial sustainability of WSPs in Kenya. The significance could be due to the fact that government investment is still insignificant despite the sector's heavy capital investment. The study further established that the source and application of the infrastructure financing determines the nature and size of influence. According to the industry experts interviewed, the infrastructure development that has happened in the recent past has had minimal impact on the financial sustainability of WSPs because it is at the mega level with limited last mile connectivity. This has affected WSPs ability to finance the infrastructure development through tariff financing since the majority of them were barely able to meet their O&M costs. There is need therefore for the country to explore partnerships with communities and NGOs while loan financing should be reduced because the sector was highly indebted and unable to service the current loan portfolio.

6.2. Recommendations

Water is a very important ingredient of life. It is also a human right and therefore sustainable access is critical. The sustainable access to this vital commodity requires the providers of the service to be financially sustainable. This study sought to establish the determinants of the financial sustainability of WSPs in Kenya as an ingredient to sustainable access to water. Based on the findings, the study recommends the following: There is need for the National Treasury and Planning and the Water Works Development Agencies (WWDAs) to ensure that infrastructure financing proposals cover the project from end-to-end. That means it should finance from source to the customer yard. Additionally, the National Treasury and Planning should ensure increased government financing for last mile connectivity. Further, the Ministry of Water, Sanitation and Irrigation (MWSI) needs to pursue enhanced collaboration with local communities and NGOs in order to tap into local resources and development grants which would reduce the indebtedness of the sector.

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8. Competing interests

The authors declare that they have no competing interests.

References

Ait-Kadi, M. (2016). Water for Development and Development for Water: Realizing the Sustainable Development Goals (SDGs) Vision. *Aquatic Procedia*, *6*, 106–110. doi:10.1016/j.aqpro.2016.06.013.

Alaerts, G. (2019). Financing for Water – Water for Financing: A Global Review of Policy and Practice. *Sustainability*, *11*(3), 821. doi:10.3390/su11030821.

Asian Development Bank. (2004). *Water in Asian Cities. In Utilities' Performance and Civil Society Views* (121303rd ed.). Manila, Philippines: National Library of the Philippines.

Aung, K., Jiang, Y., & He, S. Y. (2018). The role of water in plant–microbe interactions. *Plant Journal*, *93*(4), 771–780. doi:10.1111/tpj.13795.

Badu, E., Edwards, D. J., Owusu-Manu, D., & Brown, D. M. (2012). Barriers to the implementation of innovative financing (IF) of infrastructure. *Journal of Financial Management of Property and Construction*, *17*(3), 253–273. doi:10.1108/13664381211274362.

Baruch, Y., & Holtom, B. C. (2008). Survey response rate levels and trends in organizational research. *Human Relations*, *61*(8), 1139–1160. doi:10.1177/0018726708094863.

Bhattacharya, A., Romani, M., Stern, N., & Center for Climate Change Economics and Policy, G. R. I. on C. C. and the E. (2012). *Infrastructure for development: meeting the challenge* (No. 15). Londres.

Chitonge, H. (2010). Who is subsidising whom? Water supply cross-subsidisation policy, practice and lessons from Zambia. *The Journal of Modern African Studies*, *48*(4), 599–625. doi:10.1017/s0022278x10000625.

Creswell, J. W. (2014). *Research design, qualitative, quantitative and mixed methods approaches. In Research Handbook* (4th ed., Vol. 1). California, USA: Sage Publications, Inc.

Erfanian, E., & Collins, A. R. (2018). Charges for Water and Access: What Explains the Differences Among West Virginian Municipalities? *Water Economics and Policy*, *04*(04), 1850017. doi:10.1142/s2382624x18500170.

GoK. (1999). *Sessional Paper No. 1 of 1999 on National Policy on Water Resources Management and Development* (No. 824 KE99). Nairobi.

Hassanein, A. A. G., & Khalifa, R. A. (2007). Financial and operational performance indicators applied to public and private water and wastewater utilities. *Engineering, Construction and Architectural Management*, *14*(5), 479–492. doi:10.1108/09699980710780773.

Hering, J. G., Sedlak, D. L., Tortajada, C., Biswas, A. K., Niwagaba, C., & Breu, T. (2015). Local perspectives on water. *Science*, *349*(6247), 479–480. doi:10.1126/science.aac5902.

Hoffjan, A., Federico, V. Di, Liserra, T., & Müller, N. A. (2014). *Financial Sustainability Rating Tool for Urban Water Systems*. Europe.

Langford, M. (2005). The United Nations concept of water as a human right: A new paradigm for old problems? *International Journal of Water Resources Development*, *21*(2), 273–282. doi:10.1080/07900620500035887.

Leavy, P. (2017). *Research Design- Quantitative, Qualitative, Mixed Methods, Arts-Based, and Community-Based Participatory Research Approaches* (1st ed.). New York, USA: The Guilford Press.

Lester, S., & Rhiney, K. (2018). Going beyond basic access to improved water sources: Towards deriving a water accessibility index. *Habitat International*, *73*, 129–140. doi:10.1016/j.habitatint.2018.02.001.

Marson, M., & Savin, I. (2015). Ensuring Sustainable Access to Drinking Water in Sub Saharan Africa: Conflict Between Financial and Social Objectives. *World Development*, *76*, 26–39. doi:10.1016/j.worlddev.2015.06.002.

Martínez-Fernández, J., Neto, S., Hernández-Mora, N., Del Mora, L., & La Roca, F. (2020). The Role of the Water Framework Directive in the Controversial Transition of Water Policy Paradigms in Spain and Portugal. *Water Alternatives*, *13*(3), 1–26.

Mburung'a, S. M. (2018). Influence of Capital Structure on Sustainability of Community Water Projects. *European Journal of Sustainable Development*, *7*(4), 323–332. doi:10.14207/ejsd.2018.v7n4p323.

Means, E. G., Ospina, L., & Patrick, R. (2005). Ten primary trends and their implications for water utilities. *Journal - American Water Works Association, 97*(7), 64–77. doi:10.1002/j.1551-8833.2005.tb10933.x.

Mitlin, D., & Walnycki, A. (2019). Informality as Experimentation: Water Utilities' Strategies for Cost Recovery and their Consequences for Universal Access. *The Journal of Development Studies,* 56(2), 259–277. doi:10.1080/00220388.2019.1577383.

Montgomery, M. A., Bartram, J., & Elimelech, M. (2009). Increasing functional sustainability of water and sanitation supplies in rural sub-saharan Africa. *Environmental Engineering Science,* 26(5), 1017–1023. doi:10.1089/ees.2008.0388.

Mureithi, P. M., Luwesi, C. N., Mutiso, M. N., Förch, N., & Nkpeebo, A. Y. (2018). *Legal and Market Requirements for Water Finance in Africa: The Kenya Water Sector Reforms Case*. In A. Beyene & C. N. Luwesi (Eds.), Innovative Water Finance in Africa (Vol. 1, p. 168). Uppsala, Sweden: Nordiska Afrikainstitutet.

Parvaiz, G. S., Mufti, O., & Wahab, M. (2016). Pragmatism for Mixed Method Research at Higher Education Level. *Business & Economic Review, 8*(2), 67–78. doi:10.22547/ber/8.2.5.

Ramesh, R. (2016). Community Based Financing Mechanism for Rural Water Supply in Tamil Nadu, India. Asia-Pacific *Journal of Rural Development,* 26(1), 151–168. doi:10.1177/1018529120160106.

Rampa, F. (2011). *Analysing governance in the water sector in Kenya* (No. 124). Brussels.

Ruiters, C. (2013). Funding models for financing water infrastructure in South Africa: Framework and critical analysis of alternatives. *Water SA,* 39(2), 313–326. doi:10.4314/wsa.v39i2.16.

Ruiters, C., & Matji, M. P. (2015). Water institutions and governance models for the funding, financing and management of water infrastructure in South Africa. *Water SA, 41*(5), 660–676. doi:10.4314/wsa.v41i5.09.

Rusca, M., & Schwartz, K. (2017). The paradox of cost recovery in heterogeneous municipal water supply systems: Ensuring inclusiveness or exacerbating inequalities? *Habitat International*, *30*, 101–108. doi:10.1016/j.habitatint.2017.03.002.

Satterthwaite, D. (2016). Missing the Millennium Development Goal targets for water and sanitation in urban areas. *Environment and Urbanization,* 28(1), 99–118. doi:10.1177/0956247816628435.

Schwartz, K., Tutusaus, M., & Savelli, E. (2017). Water for the urban poor: Balancing financial and social objectives through service differentiation in the Kenyan water sector. *Utilities Policy, 30*(2017), 1–10. doi:10.1016/j.jup.2017.08.001.

Shibuya, M., Hernández-Sancho, F., & Molinos-Senante, M. (2014). Current state of water management in Japan. *Journal of Water Supply: Research and Technology - AQUA,* 63(8), 611–624. doi:10.2166/aqua.2014.140.

Tourangeau, R., Yan, T., & Sun, H. (2020). Who Can You Count On? Understanding the Determinants of Reliability. *Journal of Survey Statistics and Methodology,* 8(5), 903–931. doi:10.1093/jssam/smz034.

Tsitsifli, M. I., Komorowski, M., Boda, B., Popa, T., Gega, D., Nikolaou, I. E., & Tsagarakis, K. P. (2014). An exploratory approach for evaluating the energy and personnel share of operation and maintenance costs for water utilities in selected emerging economies of Europe. *Journal of Water Supply: Research and Technology - AQUA,* 63(5), 368–378. doi:10.2166/aqua.2013.228.

Tsitsifli, S., Gonelas, K., Papadopoulou, A., Kanakoudis, V., Kouziakis, C., & Lappos, S. (2017). Socially fair drinking water pricing considering the full water cost recovery principle and the non-revenue water related cost allocation to the end users. *Desalination and Water Treatment*, 99, 72–82. doi:10.5004/dwt.2017.21552.

UNICEF, & World Health Organization. (2015). *25 Years progress on sanitation and drinking water : 2015 Update and MDG Assessment*. Geneva.

Unnerstall, H., & Messner, F. (2007). Cost Recovery for Water Services According to the EU Water Framework Directive. *Ecological Economics of Sustainable Watershed Management*, 347–383. doi:10.1016/s1569-3740(07)07015-0.

Van de Loo, E. (2011). Influence of privatization of water delivery on access to the right to water in Kenya. *Water Policy, 13*(2), 208–219. doi:10.2166/wp.2010.071.

Van den Berg, C., & Danilenko, A. (2010). *The IBNET Water Supply and Sanitation Performance Blue Book*. doi:10.1596/978-0-8213-8582-1.

Vučijak, B., Pašić, M., & Bijelonja, I. (2018). Financial sustainability of public utilities in western balkans 1-3. *International Journal of Engineering*, 16, 53–59. Retrieved from http://annals.fih.upt.ro/pdf-full/2018/ANNALS-2018-3-07.pdf.

Wang, D., Zhang, L., Zhang, Z., & Zhao, S. X. (2011). Urban infrastructure financing in reform-era china. *Urban Studies,* 48(14), 2975–2998. doi:10.1177/0042098010392079.

Wang, W., & Hou, Y. (2009). Pay-as-you-go financing and capital outlay volatility: Evidence from the states over two recent economic cycles. *Public Budgeting and Finance,* 29(4), 90–107. doi:10.1111/j.1540-5850.2009.00944.x.

WASREB. (2018). A Performance report of Kenya's water services sector. Retrieved from https://wasreb.go.ke/impact-report-issue-no-10/.

WASREB. (2019). Impact: A performance report of Kenya's water services sector. Retrieved from https://wasreb.go.ke/impact-report-issue-no-11/.

WASREB. (2020). Impact: A performance report of Kenya's service sector. Retrieved from https://wasreb.go.ke/impact-report-issue-no-12/.

World Bank Group. (2015). Water service provider toolkit for commercial financing of the water and sanitation sector in Kenya (K. Bender & P. Njaggah, eds.). Retrieved from https://wasreb.go.ke/accessing-commercial-financing/.

Wu, H. (2011). Pricing water for sustainable cost recovery: a study on China's water tariff reform. *Water practice and technology*, 6(4). doi:10.2166/wpt.2011.0077.

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Loan asset indicators and commercial bank fragility in Kenya

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Purpose. To test the predictive ability of loan asset indicators on Commercial bank fragility in Kenya.

Design/Method/Research approach. The study adopted positivism research philosophy with exploratory research design. The study population was 42 Commercial banks in operation on 31st December 2015. Secondary data was collected from Central Bank of Kenya and analysed using Stata Statistics/Data analysis. Generalised Linear Model was used to establish the relationship between asset indicators and bank fragility. The concept of credit creation was explored as the genesis of bank fragility. This study is part of early warning systems in detecting bank fragility.

Findings. The research found a direct relationship between a lagged dependent variable, loan portfolio growth, loan deposit ratio and bank fragility.

Practical implications. Recommendations are followed on the basis of this study. At first, regulator develop a potential solution to control loan portfolio growth, cap loan deposit ratio and limit the level of non-performing loans. Banking practitioners should model monthly reporting requirements to ensure that banks are able to disclose the ratio and explain any significant changes. Secondly, since Non-performing loans can act as an incentive for bank managers to seek deposits and lend more thereby exacerbating the problem, banks with NPL to gross loans greater than an upper threshold determined by the regulator should not be allowed to attract more deposits. Thirdly, set the maximum level of loan deposit ratio to avoid expensive, sensitive and high-risk loan capital. Implementation of these recommendations will lead to secured social welfare.

Originality/Value. The study examines the role of certain loan asset indicators on bank fragility and extends the discussion in the area of early warning systems and commercial bank instability in Kenya.

Research limitations/Future Research. This research contributes to the discussion on bank fragility and early warning systems. The further research should review evidence from other jurisdiction with high numbers of distressed institutions to determine how many months or years before distress the three significant variables could predict fragility. Besides, there is need for research on insider loans as defined and why there was no statistical significance.

Paper type. Empirical.

Keywords: bank fragility; loan assets; credit creation; generalised linear model.

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Показники кредитних активів та вразливість комерційного банку у Кенії

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Мета роботи. Перевірити прогностичну здатність показників позикових активів щодо вразливості комерційних банків у Кенії.

Дизайн/Метод/План дослідження. Ця робота базується на позитивістській дослідницькій філософії з дослідним дизайном. У дослідженні брало участь 42 діючих на 31 грудня 2015 року комерційних банки. Вторинні дані були зібрані з Центрального банку Кенії і проаналізовані з використанням Stata Statistics/Data analysis. Узагальнена лінійна модель використовувалася для встановлення зв'язку між показниками активів і вразливістю банків. Концепція створення кредитів була досліджена як генезис вразливості банків. Це дослідження – частина систем раннього попередження для виявлення нестабільності банків.

Результати дослідження. Виявлено прямий зв'язок між залежною змінною, що відстає, зростанням позичкового портфеля, коефіцієнтом позичкових депозитів і вразливістю банків.

Практичне значення дослідження. Рекомендації, що наведено нижче, розроблено на основі цього дослідження. По-перше, регулятору потрібно розробити потенційне рішення для контролю за зростанням кредитного портфелю, співвідношення кредитного портфелю банку до обсягу депозитів та обмеженням рівня непрацюючих позик. Необхідно змоделювати вимоги щодо щомісячної звітності банківських установ, щоб банки могли розкривати ці показники та пояснювати будь-які їх суттєві зміни. По-друге, оскільки непрацюючі позики можуть слугувати стимулом для менеджерів банків шукати депозити та надавати більше позик, тим самим посилюючи проблему, банкам з непрацюючими позиками на загальну суму вище верхньої межі, що встановлена регулятором, слід не дозволяти залучати додаткові депозити. По-третє, встановити максимальний рівень коефіцієнта позикових депозитів, щоб уникнути дорогого, чутливого та високоризикового позикового капіталу. Виконання цих рекомендацій зумовить гарантоване соціальне забезпечення.

Оригінальність/Цінність/Наукова новизна дослідження. Досліджено роль окремих показників кредитних активів у вразливості банків й розширено обговорення в області систем раннього попередження й нестабільності комерційних банків в Кенії.

Перспективи подальших досліджень. Це дослідження сприяє обговоренню уразливості банків і систем раннього попередження. В ході подальших досліджень доцільно вивчити дані з іншої юрисдикції з великою кількістю проблемних установ, щоб визначити, за скільки місяців або років до настання кризової ситуації три важливі змінні можуть передбачити вразливість. Крім того, існує потреба в дослідженні інсайдерських кредитів в тому вигляді, в якому вони визначені, і причин відсутності статистичної значущості.

Тип статті. Емпіричний.

Ключові слова: нестабільність банків; позичкові активи; створення кредиту; узагальнена лінійна модель.

Показатели кредитных активов и уязвимость коммерческого банка в Кении

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Цель работы. Проверить прогностическую способность индикаторов кредитных активов на уязвимость коммерческого банка в Кении.

Дизайн/Метод/План исследования. Это работа базируется на позитивистской исследовательской философии с исследовательским дизайном. В исследовании приняло участие 42 действующих на 31 декабря 2015 года коммерческих банка. Вторичные данные собраны из Центрального банка Кении и проанализированы с использованием Stata Statistics/Data analysis. Для установления связи между показателями активов и уязвимостью банков использована обобщенная линейная модель. Концепция создания кредита рассматривалась как источник хрупкости банков. Данное исследование – часть систем раннего предупреждения для выявления уязвимости банков.

Результаты исследования. Выявлена прямая связь между запаздывающей зависимой переменной, ростом ссудного портфеля, коэффициентом ссудных депозитов и уязвимостью банков.

Практическое значение исследования. Рекомендации, представленные ниже, разработаны на основе этого исследования. Во-первых, регулятору необходимо разработать потенциальное решение для контроля за ростом кредитного портфеля, соотношение кредитного портфеля банка к объему депозитов и ограничением уровня неработающих займов. Необходимо смоделировать требования к ежемесячной отчетности, чтобы банки могли раскрывать эти показатели и объяснять любые существенные изменения. Во-вторых, поскольку неработающие ссуды могут служить стимулом для менеджеров банков искать депозиты и предоставлять больше ссуд, что усугубляет проблему, банкам с неработающими кредитами на общую сумму выше верхнего порога, установленного регулирующим органом, не следует разрешать привлекать дополнительные депозиты. В-третьих, установить максимальный уровень коэффициента ссудного депозита, чтобы избежать дорогостоящего, чувствительного и высокорискового ссудного капитала. Выполнение этих рекомендаций приведет к гарантированному социальному обеспечению.

Оригинальность/Ценность/Научная новизна исследования. Исследована роль определенных показателей кредитных активов в уязвимости банков и расширено обсуждение в области систем раннего предупреждения и нестабильности коммерческих банков в Кении.

Перспективы дальнейших исследований Этим исследованием обсуждается уязвимость банков и систем раннего предупреждения. В ходе дальнейших исследований целесообразно изучить данные других юрисдикций с большим количеством неблагополучных учреждений, чтобы определить, за сколько месяцев или лет до наступления кризисной ситуации три значимые переменные могут предсказать нестабильность. Также существует потребность в исследовании инсайдерских кредитов в том виде, в каком они определены, и причин отсутствия статистической значимости.

Тип статьи. Эмпирический.

Ключевые слова: нестабильность банков; ссудные активы; создание кредита; обобщенная линейная модель.

1. Introduction

The focus on loan asset indicators in this study was predicated on the fact that loans constitute the highest percentage of bank assets, are a source of fraud in form of insider loans and cause liquidity problems when the rate of loan default is high. Besides, loans are a source of interest income and therefore high loan default leads to lower profitability or losses. Losses have to be absorbed by bank capital. Bank fragility may emerge from the institution's liability or asset side of its balance sheet. *Shen and Chen* (*2008*) posit that weaknesses from the liability side may come about due to depositors run on a commercial bank. The asset side triggers concern due to deterioration of the quality of the loan asset. *Laeven* (*2011*) shows that large losses on bank's balance sheets will render the bank insolvent. These losses normally emanate from long periods of asset quality deterioration due in part to excessive credit expansion.

Alvarez-Franco and Restrepo-Tobon (*2016*) state that during and immediately after 2007-2009 US financial crisis three hundred twenty-two (322) US Commercial banks failed with an estimated loss of USD 86 billion to the FDIC compared to the period 1980-1989 when one thousand four hundred sixty-seven (1467) banks failed with an estimated cost of $62 billion and to the period 1990-1999, four hundred thirty-six (436) banks failed with estimated loss of $7 billion. *Cleary and Hebb (2016)* state that the FDIC fund went into the red during 2009 and that is a confirmation of the severity of bank distress. *Papanikolau* (*2018*) using US Commercial and Savings Bank data for the period 2003-2009 finds that in the course of the global financial crisis a considerable number of banks were distressed which inflicted substantial losses on governments and led to a surge in the level of public debt in a number of countries. Many governments borrowed to bail out their banking institutions.

Brownbridge (*1998b*), shows the impact of bank distress in some African countries and states that for the period 1993/94 about 11 % of total assets of banks and Non-Bank Financial Institutions (NBFIs) was held by collapsed institutions in Kenya, while in Nigeria and Uganda the failed institutions accounted for 8 per cent and 6 per cent of all bank assets respectively. According to *Granja, Matvos and Seru* (*2017*), the mean FDIC loss from selling a distressed bank was 28% of assets over the period 2007 to 2013, such losses left the deposit funds reserves virtually depleted.

Kenya has witnessed periodic bank instability with consequences on bank stakeholders and the economy. *Brownbridge* (*1996*) states that the first cycle of bank problems in Kenya was the period 1984-1986, during which time Central Bank of Kenya liquidated banks after they failed to repay deposits obtained from state owned enterprises. *Le Gall, Daumont and Leroux* (*2004*) find four (4) banks and twenty-four (24) non-bank financial institutions accounting for 15% of Kenya's financial systems liabilities that were affected by liquidity or solvency problems between 1985-1989.

Le Gall et al. (*2004*) assert that a systemic banking crisis occurs when non-performing loans to total assets are between 5-10%. *Shehzad, Haan and Scholtens* (*2010*) argue that bank owners and managers may collude against depositors and may grant loans that are considered high risk and may lead to high levels of impaired loans imperiling the banks health. *Caprio and Klingebiel* (*1997*) state that banks can disguise troubled loan credits by rolling them over or embark on deposits expansion to help improve the outlook of balance sheets. With improved deposits banks invest in high-risk and high return areas. *Zhang, Cai, Dickinson and Kutan* (*2016*) argue that managers have self-motivation to take on highly risky lending than the desired level because of managerial rent seeking. Banks then shift this risk to depositors.

Laeven (*2011*) confirms the potential debilitating effect of bank instability on the economy due to its role in allocation of funds. Besides, a bank crisis leads some businesses to suffer drains of working capital and investment. Therefore, there is need to distinguish banks according to their financial health and intervene early to avoid an economy-wide impact. If the regulatory authorities can detect problems early enough and take action, this ends up preventing or minimizing the cost of distress. It is because of huge costs of distress resolution as *Dungey and Gajurel* (*2015*) argue that major focus of prudential effort should centre on avoiding banking crises because they are costly. *Huang, Chang and Liu* (*2012*) state that the consequence of bank failure is financial distress, which may affect other industries. *Huang et al. (2012)* assert that banks receive deposits, which they loan out to earn income, it is this intermediation process which fosters an industrial growth and economic development, the process that distinguishes banks from other business entities. This process is disrupted when there is bank instability. *Kedir, Iftikhar, Murinde and Kamgnia* (*2018*) hold that bank characteristics are a key driver of fragility. However, *Gorton (2018)* asserts that financial crises have taken place in market economies throughout history. Since early bank distress studies carried out by *Meyer and Pifer* (*1970*) and *Thomson (1991)*, banks still fail. Consequently, the gap in research was how to model loan asset indicators and bank fragility to build on the knowledge on early warning systems.

2. Theoretical background

2.1. Bank fragility

Demirguc-Kunt and Detragiache (*1998*) state that bank fragility arises when NPL ratio to total assets is greater than 10%. Non-performing loans (NPL) are therefore significant variables in fragility studies. *Ozili* (*2015*) asserts that early warning signals of an impaired loan asset (NPLs) as a variable is gaining importance to bank managers and credit controllers. An increment in the impaired loan asset without corresponding expansion in a good loan portfolio reduces the value of the loan portfolio and could precipitate bank solvency problems.

2.2. Loan asset indicators and bank fragility

Uysal (*2013*) states that loans and deposits make up about 65% and 80% of banks assets and liabilities respectively; this makes the financial statements of Commercial banks different from those of other firms. According to *Wheelock and Wilson* (*1995, 2000*), loans constitute the most illiquid and risky bank assets. Besides, the more concentrated bank assets are in loans the more the possibility of distress is. *Poghosyan and Čihák* (*2009*) find that asset indicators play an important role in early warning models of bank distress. According to *Ozkan-Gunay and Ozkan* (*2007*) asset quality variables present a better picture of performance with a lower portion of non-performing loans to total loans. *Cole and White (2010)* find that banks with better asset quality stand a lower chance of financial distress, and worse asset quality is associated with the probability of failure.

Loans are an integral part in virtually all CAMELS indicators. Besides, loans constitute the most significant percentage of total assets, *Uysal* (*2013*). *Sarkar and Sriram* (*2001*), *Ozkan-Gunay and Ozkan* (*2007*) use non-performing loans to primary capital as a measure of capital adequacy and state that capital adequacy is useful for survival because capital absorbs losses. *Tatom and Houston* (*2011*), *Zaghdoudi* (*2013*), *End* (*2016*) measure liquidity indicators using total credit to total deposits. When a bank issues loans, borrowers pay interest, which is bank's revenue. When there is borrowers' default, the interest income is lost. Besides, when a periodic repayment of principal stops, the banks face a liquidity crunch.

Kedir et al. (*2018*) find that banks on the African continent have had bad debts problem due to a long-standing problem of credit risk management. Therefore, *Bologna* (*2013*) argues that there is need to regulate financial institutions. This is to ensure the preservation of financial stability and the protection of depositors as these entities are susceptible to adverse selection and moral hazard. According to *Makinen and Solanko* (*2018*), poor asset

quality has a positive association with bank distress. *Whalen and Thomson* (*1988*) argue that non-performing loans are good proxy for asset quality as asset quality has a predictive ability in assessing the solvency of a bank. The growth of indebtedness (loans) by directors, officers and employees (DOE) is considered a red flag. *Meyer and Pifer (1970)* state that loans to insiders are riskier than loans to outsiders, and large loans to insiders are considered a pointer to poor management or embezzlement. *Sarkar and Sriram (2001)* argue that deterioration of asset quality is a risk that indicates that a bank is unlikely to collect 100% of its asset, which means a lower asset quality could lead to a greater loan charge off during bad economic times leading to increased chances of insolvency.

2.3. Non-performing loans and bank fragility

Boudriga, Taktak and Jellouli (*2009*) argue that aggregate rate of NPL is a frequently used measure of bank soundness. Further they state that NPLs are a major problem for both local and international regulators and whereas aggregate NPLs exhibit wide disparities between countries, some suffer severely with rates greater than fifteen (15) percent. Some researchers including *Whalen* (*1991*) find asset quality as a predictor of bank failures. *Fofack* (*2005*) states that incidences of banking crises are frequently associated with a huge build-up of non-performing loans. Further non-performing loans account for a sizeable percentage of total assets of distressed financial institutions. *Fofack* states that the banking crises that affected most sub-Saharan African countries were precipitated by an accumulation of nonperforming loans.

2.4. Growth of loan portfolio and bank fragility

Messai and Gallali (*2015*) find that during an expansion phase, banks take on more risks through uncontrolled lending activities without considering the quality of individual loans. Such loans are prime candidates of impairment during an economic downturn, thereby exposing the bank to insolvency. *Altunbas, Manganelli and Marques-Ibanez* (*2015*) concur and state that an aggressive loan growth and excessive reliance on short term funding point to risk concentration. *Jin, Kanagaretnam and Lobo* (*2018*) find a positive association between higher loan growth rates and bank fragility. *Logan* (*2001*) also finds the failure of Bank of Credit and Commerce International SA (BCCI) was due to among other reasons, dependency on net interest income, low loan growth and low profitability. Logan argues that when there is a fast loan growth, concentrations occur, appraisal standards may become weaker, and may be financed by more volatile funding sources. Following this sequence, loan quality problems start, profits decline, and inadequate provision levels start to surface.

2.5. Insider loans and bank fragility

The Banking Act and Central Bank of Kenya Prudential Guidelines (2013) limit borrowings by a single insider to twenty percent (20 %) of the bank's core capital. Besides, in aggregate credit facilities to all insiders are capped at 100% of the core capital. These prohibitions ensure that facilities to insiders are limited to owners' capital component and, therefore, limit the level of depositors' funds that may be misapplied by directors, management and staff and their related associates.

Brownbridge (*1998a*) finds that the most significant contributor to bad debts of the failed banks in Kenya, Nigeria, Uganda and Zambia was insider lending. Insider loans accounted for 65% of the total loans of four banks liquidated in Nigeria in 1995, and almost half of the loan portfolio of a bank taken over by the Bank of Uganda. According to *Thomson* (*1991*), insider loans act as a proxy for management risk that is the risk of fraud. Insider loans can be treated as self-lending and this is to mainly take advantage of asset price booms. Besides, insider loans may be granted at discretionary rates.

2.6. Loan quality and bank fragility

The *Federal Reserve Bank of Kansas City* (*2016*) avers that Loans constitute most commercial bank assets, therefore interest earned on this asset class form an important source of a revenue stream. In such a case a relatively small problem with the loan portfolio can reduce earnings, deplete capital and precipitate bank weaknesses. *Logan (2001)* states that management should diversify into other types of businesses to earn fees, commissions, or trading income. Besides, the probability of a bank failing declines with increase in net interest income. A declining net interest income can result from poor loan quality and increase in interest expense. An increase in interest expense means the sources of deposit are expensive thereby undermining the return from interest on loans. *Clancy and Zhao* (*1999*) show that the performance of a bank in the intermediation function is determined by its efficiency. Failing banks tend to pay higher interest rates to attract deposits and earn lower returns on loans due to high levels of underperforming assets.

2.7. Loan deposit ratio and bank fragility

End (*2016*) states that Loan Deposit Ratio (LDR) is an indicator of liquidity mismatch risk and therefore when loans exceed a deposit base, the funding gap has to be met through the access of funds in the financial markets. *Cecchetti, King and Yetman* (*2011*) show that during the financial crisis of 2007/2008 economies where banks had relatively low LDR managed the crisis relatively well compared to those with high LDR. *Cucinelli* (*2015*) finds that a lower level of the ratio of loans to deposits represents a lower dependence on wholesale funding which means that the bank is less market constrained in its asset growth. *Momparler, Carmona and Climent* (*2016*) also find that the higher the net loan to deposits is, the higher the chance of future financial distress is.

A study conducted by *Wood and Skinner* (*2018*) on commercial banks in Barbados found LDR to have a significant effect on non-performing loans; ultimately increase in LDR leads to aggressive lending resulting in setting aside funds to low quality borrowers thereby increasing the riskiness of the loan portfolio and thus pointer to bank weaknesses. *End* (*2016*) shows that China imposed an upper limit of 75% for its banks. An upper limit can help avoid mismatches between loans and stable funding and help check a build-up of systemic risks in the banking system.

2.8. Credit creation theory and bank fragility

The proponents of credit creation like *Werner (2014, 2016)* advance argument that banks can create credit without any deposits. *Werner* (*2016*) avers that the credit creation theory holds that each bank can individually create money out of nothing through accounting operations and it is done by creating loan facilities. *Werner* (*2014*) asserts that when a bank extends credit to a customer, it creates a fictitious deposit by recording the loan amount in the borrower's account even though no deposit is made. Two entries are made, a credit to the borrower's current account and a debit to the borrower's loan account. What is created is a loan whose disbursement creates a deposit called an imaginary deposit. *Werner* (*2014*) concludes that banks invent funds by crediting the borrower's account with a deposit when no new deposit has actually taken place. *Turner* (*2012*) states that the most distinctive thing banks can do is to create credit, which result in spending power. *Cochran, Call and Glahe* (*1999*) show that money enters the economic system as banks grant new loans. These loans are negotiated using other people's money (deposits). They further argue that money creation does not involve reduction in present satisfaction on the part of depositors and can therefore finance investments without any previous equal savings.

McLeay, Radia and Thomas (*2014, 2015*) state that when a bank grants a loan, it concurrently creates a matching deposit in the

borrower's bank account. It is argued that it is the way new money is created. *Cochran et al. (1999)* show that borrowed money can be spent and returned to the banking system as additional deposits and the process continues as new deposits and leads to additional loanable funds. *Turner (2012)* shows that the ability of banks to create credit and money has implications on demand and can be disastrous if the loans created are poor credits. These poor credits can easily lead the bank to insolvency especially if depositors precipitate a run on the bank. In view of these facts, there are necessary prudential controls on maturity transformation and the degree of leverage by the bank.

Credit creation is linked to loan quality, growth, insider credit and concentration of the loan portfolio. A bank creates deposits from nothing when it credits borrowers both insiders' and outsiders' current accounts with loan proceeds. This artificial deposit means that the level of deposits goes up as more loans are granted. As the level of deposits increases, therefore the bank can lend more, the process continues like that if the borrowers do not use the funds for consumption. However, due to impairment of the loan portfolio, credit creation must have a limit. With increased lending, some credits get impaired.

3. Statement of the problem and research hypotheses

During the latest episode of bank instability in Kenya 2015-2016, customer deposits of about 129 billion Kes was held up in three distressed Commercial banks. The customers funds became inaccessible with borrowers and depositors impacted negatively. Besides, it takes many years to resolve bank fragility problems, the reason ways should be found to minimise the incidence of bank weaknesses. According to Kenya Deposit Insurance Corporation annual report 2015, the payment of deposits to customers with banks distressed in 1990s is still ongoing! Due to the documented financial crises, *Ozkan-Gunay and Ozkan (2007)* argue that it is done in order to look for a new crisis prevention, prediction and management method. *Baron and Xiong (2017)*, on the other hand, contend that policy makers should embrace early warning systems in order to stem future financial crises. *Messai and Gallali (2015)* affirm that the objective of early warning models is to ensure ability to forecast problems in financial institutions and take remedial measures before they occur. *Kolari, Glennon, Shin and Caputo (2002)* suggest that bank examiners are concerned about early warning systems that aid information collected during the on-site inspection as this helps predict impending distresses and also allow early intervention to prevent failure or reduce costs of distress.

Purpose of this study is to test the predictive ability of loan asset indicators on Commercial bank fragility in Kenya.

Main hypothesis:

H_{01}: Growth of a loan portfolio has no statistically significant relationship with bank fragility.

H_{02}: Loans to a deposit ratio has no statistically significant relationship with bank fragility.

H_{03}: Loan quality has statistically no significant relationship with bank fragility.

H_{04}: Insider loans have statistically no significant relationship with bank fragility.

4. Research design, method and data

4.1. Research Design

Bryman *(2012)* shows that a research design provides a framework for the collection and analysis of data. Besides, the research design shows the importance given to causal relationship among variables, the generalisations to larger groups from the sample, understanding behaviour and meaning and temporal appreciation of social phenomena and interconnection. Consequently, the research design in this study was an explanatory research.

4.2. Method, data collection, exclusion and measurement of variables

This study is based statistical analysis method using Stata Statistics/Data analysis.

Target population according to *Welman and Kruger (2001)* is the population in which the researcher would ideally like to generalise the results. The target population of this research was forty-two (42) commercial banks. In this study, a census was adopted due to the small population size.

Secondary data was collected from the Central Bank of Kenya. The study period was 2010-2014. The banks that ceased to exist due to mergers and acquisition or were incorporated after the end of study period that was 2015 were excluded from the study. Commercial banks with less than five-year data or with zero non-performing loans were excluded. The study did not extend data collection to 2016 and 2017 following the Banking (Amendment) Act of 2016, which introduced interest rate caps in Kenya in September 2016. Interest rate caps have an impact on bank performance.

Whereas the inferential study period is 2010-2014, this study conducted a cross-sectional-time series analysis from 2005 to 2015 to test the stability of the study variables and measure a fragility variable. The reason for the period 2005-2015 centered on the introduction of an interest ceiling in 2016 which had an influence on the performance of banks.

Besides, the period of 2005 is significant because the last bank placed under statutory management was in 2006, therefore a year before the event was found appropriate.

The study variables were measured as indicated in *Tab. 1.*

Table 1: Variable Measurement*

Variables	Researcher(s)	Measures
Bank fragility	*Carapeto Moeller, Faelten, Vitkova and Bortolotto (2011)*	$\frac{\text{Gross Non} - \text{Performing Loans}}{\text{Total Loans}}$
Growth of loan portfolio	*Rauch (2000)*	$\frac{\text{Total Loans year t minus Total Loans year t} - 1}{\text{Total Loans year t} - 1}$
Loan quality	*Calomiris and Mason (2003)*	$\frac{\text{Net Interest Income}}{\text{Total Income}}$
Loans to Deposit Ratio	*Cecchetti, King and Yetman (2011)*	$\frac{\text{Net Loans}}{\text{Customer Deposits}}$
Insider Loans	*Thomson (1991)*	$\frac{\text{Total Insider Loans}}{\text{Total Assets}}$

*__Source:__ compiled by the author.

5. Results

5.1. Descriptive statistical analysis

The importance of a descriptive statistical analysis for the period 2005-2015 was to draw inferences over a longer time for the mean, minimum, maximum percentages of the variables and then make meaningful conclusions.

Non-Performing Loans to Total Assets

This ratio is the measure of bank fragility and is pegged at 10%. In 2005 and 2006 the NPL/total assets ratio was 18.70% and 13.58%. The two years 2005-2006 coincide with the end of 1993-2005 bank distress in Kenya. The ratio of NPL to total assets declined from 9.34% in 2007 to 4.28% in 2011; then started an upward trajectory in 2012 at 4.35%, 2013 at 5.20% and had reached 6.36% and 6.50% by 2014 and 2015 respectively.

The minimum NPL/Total assets ranged from 0.00% to 0.76%; maximum ratio oscillated from 22.84% in 2011 to 102.67% in 2005. The maximum ratio in 2013 and 2014 was 51.32% and 66.08% respectively from 26.08% in 2012. The spike in the maximum ratio started one-two years before fragility events of 2015- 2016.

Growth of Loan Portfolio

The average growth of the loan portfolio in a banking industry during the period was minimum of 21.30% with the highest growth of 333.44%. Dubai Bank and National Bank of Kenya had the negative growth of 5.36% and 70.39% respectively. Though the overall industry growth from 2005-2015 ranged from 21.30% to 41.16%, there was mixed growth percentages among individual banks.

Loan Deposit Ratio

The maximum LDR for the period ranged from 103.24% to 200.46%. During the entire period of eleven years, the maximum LDR was above 100.00% signalling overreliance on loan capital by some Commercial Banks. Higher LDR as shown by some banks in this study reflects fewer customer deposits to fund a loan book.

Loan Quality

Loan quality is a measure of dependency on interest income. During the period under the study, the minimum loan quality was 1.28% and maximum 76.92%. The industry average was 45.50%, a confirmation of non-dependency on interest income as a source of revenue for Commercial Banks in Kenya. It also shows the structure of deposit and Loans in Commercial banks businesses.

Insider Loans

The industry average for insider loans for the period was between 3.3% between 2005 and 2015. The statistics for the period 2005-2006 are indicative of a problem time with high insider loan levels of 54% to 59.7% for some of the banks.

This was a clear breach of fiduciary duty by the directors, management and staff of the commercial banks, an indication of the fact that insiders use customer deposits for their own self-interest.

5.2. Diagnostic tests

Normality Test Results

According to *Gujarati and Porter* (*2009*), if the computed p-value is sufficiently low, then the hypothesis that the residuals are normally distributed is rejected.

The p-values for all variables are prob>z, 0.00. The p-values in this case are low therefore, the normality test assumption was rejected and concluded that the residuals were non-normally distributed. Using the Shapiro-Wilk W test for normality, the H_o=data is normally distributed was rejected.

Heteroscedasticity Test Results

A null hypothesis was constructed that the variance of the error term was constant that is homoscedastic**.** *Ott and Longnecker* (*2010*), the null hypothesis is H_o: Homogeneous variances while H_a: test heterogeneous variances for the regression model. The White's test *Chi2*(35)=87.76, *Prob>Chi2*=0.00 shows the evidence of heteroscedasticity, therefore the null hypothesis that the variances are constant was rejected.

Stationarity Test Results

Using the Harris-Tzavalis Unit Root test, some of the study data was found stationary. The null hypothesis that the data was a unit root was rejected for some study variables. The following variables were stationary, loan growth (*p-value*=0.00), loan quality (*p-value*=0.00), insider loans (*p-value*=0.00), lagged dependent variable (*p-value*=0.00), while bank fragility (*p-value*=0.97); Loan deposit ratio (*p-value*=0.25) showed the evidence of a unit root.

Multicollinearity Test Results

According to *Gujarati and Porter* (*2009*), the CLRM assumption that there is no exact linear relationship between independent or explanatory variables that is no multicollinearity. *Ott et al.* (*2010*) argued that the consequences of highly correlated independent variables are that the overall F-Test would be highly significant but none of the individual t-tests would come close to significance. The variance inflation factor (*VIF*) was used to test for the presence of multicollinearity in the study data (*Tab. 2*).

Table 2: Multicollinearity*

Variable	*VIF*	*1/VIF*
lagbf1	1.74	0.573253
il	1.47	0.679442
lq	1.28	0.781290
ldr	1.23	0.816042
lg	1.05	0.949270
Mean	*VIF*	*1.36*

* ***Source:*** compiled by the author.

The Variance Inflation Factor (VIF) for lagged bank distress was 1.74; insider loans 1.47, loan quality 1.28, loan deposit ratio 1.23, and loan growth 1.05 indicated that VIF for all the variables was below 10 and 1/VIF was above 0.1 that is a confirmation of tolerable levels of collinearity. *Gujarati and Porter* (*2009*) argue that multicollinearity is a matter of degree. The researcher concluded collinearity between the independent variables was too low to be problematic.

Table 3: Pearson Correlation matrix*

	bf	*lagbf1*	*lg*	*ldr*	*lq*	*il*
bf	1.0000					
lagbf1	0.8948	1.0000				
lg	-0.1190	0.0752	1.0000			
ldr	0.3949	0.3378	-0.1292	1.0000		
lq	-0.3032	-0.3403	0.0320	0.0436	1.0000	
il	0.4747	0.4897	-0.0589	0.3207	0.0519	1.0000
95% confidence interval						

* ***Source:*** compiled by the author.

Gujarati and Porter (*2009*) states that correlation coefficient more than 0.8 means collinearity is a serious problem. The above (*Tab.3*) shows a high significant positive correlation 0.89 (0.00) between the dependent variable and the lagged dependent variable meaning it contributes significantly to the variations in the dependent variable. The dependent variable is negatively correlated to the growth of loan portfolio -0.12, loan deposit ratio 0.39, loan quality -0.30, and insider loans 0.47. The correlation between the dependent variable and the loan growth is negative and insignificant while it is low and positive with the loan deposit ratio. The loan quality and dependent variable have a negative but significant relationship, insider loans are positively correlated with the dependent variable and significant at 0.05 level.

5.3. Generalised linear model analysis

The GLM is preferably where variables show non-normality. The assumptions underlying GLM state that the data $Y_1, Y_2, \ldots Y_n$ are independently distributed, the dependent variable Y_1 does not need to be normally distributed but assumes a distribution from the exponential family, does not assume a linear relationship between dependent and independent variables but assumes a linear relationship between the transformed response in terms of the link function. Besides, the independent variable can take on power terms or some non-linear transformation, the homogeneity of variances does not need to be satisfied, errors need to be independent but not normally distributed.

The study utilised a lagged dependent variable as one of the independent variables in the model. According to *Keele and Kelly* (*2006*), the use of a lagged dependent variable is part of a robust estimation strategy. Besides, it is a strategy to eliminate autocorrelation in the residuals.

The GLM was specified as follows (1):

$$g(E(Y|X1,X2,\ldots XP))=Ybf_{it}=\beta_0 Ybf_{it-1}+\beta_1 lg_{it}+\beta_2 ldr_{it}+\beta_3 lq_{it}+\beta_4 il_{it} \quad (1).$$

The variables were defined as follows:

$Y=bfit$=Bank Fragility for i^{th} firm in t^{th} year,

Y_{BFit-1}=lagged dependent variable (*lagbf1*),

lg_{it}=Growth of loan portfolio (*lg*),

ldr_{it}=Loan Deposit Ratio (*ldr*),

lq_{it}=Loan quality (*lq*),

il_{it}=Insider Loans (*il*),

$\beta_1$toβ_5=Coefficient of independent variables,

i=1,2,… 30 (Individual banks),

t=1,2,… 5 (time indicator).

5.4. Generalised linear model regression

The GLM regression (*Tab.4*) with clustered robust showed a lagged bank fragility variable β=0.87, *Z*=12.26, *P*>z=0.00. This variable had the most influential impact on bank fragility. The growth of a loan portfolio variable had β=-0.08, *Z*=-2.91, *P*>z=0.00, the growth of a loan portfolio had a negative relationship with bank fragility. Loan Deposit ratio β=0.13, *Z*=2.78 with *P*>z=0.00 was statistically significant. A loan deposit ratio is a significant variable in bank fragility studies as confirmed by z-values. The loan quality had β=-0.06, *Z*=-1.49, *P*>z=0.14. The loan quality had a negative and insignificant relationship while Insider loans β=0.16, *z*=0.88 and p-value of 0.38 had a positive insignificant relationship with bank fragility.

Table 4: GLM Regression*

Generalized linear models				No. of obs=120		
Optimization: *ML*				Residual df=114		
				Scale parameter=0.0018501		
Deviance=0.2109083935				(*1/df*) *Deviance*=0.0018501		
Variance function: *V*(*u*)=1				[Gaussian]		
Link function: *g*(*u*)=u				[Identity]		
				AIC=-3.405946		
Log pseudolikelihood=210.3567642				*BIC*=-545.5632		
(Std. Err. adjusted for 120 clusters in bf)						
bf	***Robust Coef.***	***Std. Err.***	***z***	***P>|z|***	**[95% Conf. Interval]**	
lagbf1	0.8669464	0.0707056	12.26	0.000	0.7283661	1.005527
lg	-0.0794346	0.0273098	-2.91	0.004	-0.1329608	-0.0259083
ldr	0.1318089	0.0473954	2.78	0.005	0.0389156	0.2247021
lq	-0.0561592	0.0377602	-1.49	0.137	-0.1301678	0.0178495
il	0.1607703	0.1835397	0.88	0.381	-0.1989609	0.5205014
cons	-0.0539984	0.0387617	-1.39	0.164	-0.12997	0.0219732

*__Source:__ compiled by the author.

6. Discussion

Descriptive statistics are shown in *Tab. A-1 - Tab. A-6* (*Appendix A*). The measure of fragility averaged between 13.58% to 18.70% with maximum ratios between 51.32% and 66.08%. The ratios were above 10% fragility measure that was an indication of banking sector instability that required intervention before the banking distress events of 2015-2016. It is therefore established the Kenyan banking industry was unstable.

The maximum LDR for the period 2005-2015 ranged between 103.24% to 200.46%. Consistent with *End* (*2016*), an LDR of 120% is a presumptive benchmark for a banking crisis while an average of 80% according to ECB is a sign of impaired financial intermediation. Practically, LDRs above such prescriptive rates were considered a sign of bank fragility. *Bologna* (*2011*) argues that LDR provides a measure of funding mix by a bank to finance its loan portfolio. Consequently, banks that rely on high level loan capital as a percentage of deposits tend to be fragile. Based on this analysis, high industry LDR were an early sign of weaknesses within the banking sector. High LDR indicates that a credit creation process is less dependent on deposits.

Some banks had the negative growth of a loan portfolio of 5.36% and 70.39% over the period. The negative growth of a loan portfolio signals a contraction in a loan asset ultimately resulting in decline in interest income. The loan quality variable averaged 45.50%, however, the maximum percentage for the period was 76.92%. A rapid increase in the loan portfolio could signal the low standards of loan underwriting. This is a credit creation process. Some banks had an insider loans ratio between 54% and 59.7% but was camouflaged by the average industry ratio of 3.3%.

The GLM regression results showed LDR β=0.13, p-value 0.00. At 5% level, the LDR variable has a positive significant relationship with bank fragility. Consequently, the null hypothesis is rejected.

The variable was statistically significant, as LDR goes up, bank fragility also goes up. Continued credit creation could lead to bank distress especially if some of the credits are impaired. Other researchers like *Wood and Skinner* (*2018*) found LDR coefficient of 0.334, p>t of 0.028 which was significant at 5% level and concluded that LDR had a significant positive effect on non-performing loans, a proxy for distress.

The growth of a loan portfolio had β=-0.08, p-value 0.00, that was a significant but negative relationship. An increase in the loan portfolio in this case led to the decline in fragility. The growth of a loan portfolio is a significant variable. An increase in loans confirms credit creation by banks. *Kedir, Iftikhar, Murinde and Kamgnia* (*2018*) also found that the growth of a loan was statistically significant at 10% level with the coefficient of -0.019 which meant a high loan growth reduced fragility as measured by impaired loans as a percentage of gross loans. However, with a few banks exhibiting a negative growth, this showed the possibility of instability.

The loan quality variable had β=-0.06, p-value 0.15, which was a negative relationship but statistically insignificant. *Alvarez-Franco and Restrepo-Tobon* (*2016*) observe that loan quality is an important pointer to bank survival and argue that less diversified banks are more likely to fail due to dependence on interest income. *Huang et al.* (*2012*) study found p-value for ASEAN at -0.156; G8 -0.859, EU at -1.253, NIC at -0.086 and G-20 at -0.258 all being significant at 5% level that is p-value<0.05 and concluded that net interest income predicted the financial distress of global banks best. *Logan* (*2001*) found bank distress to be positively related to dependence on traditional sources of income that is net interest income for the banks. *DeYoung and Torna* (2013), however, found that one standard deviation increases in net interest income reduced chances of failure by 27%. The above results are at a variance with *Huang et al.* (*2012*), *DeYoung* and *Torna* (*2013*). Most Kenyans commercial banks have reduced dependency on interest income and ventured into non-interest income due to among others the legislation to control interest which was discussed for a long time and culminated in-duplum rule section 44A (1) and (2) of the Banking Act which was enacted in 2006 and interest rate capping in 2016.

Insider loans had β=0.16, p-value=0.38. The results showed a positive relationship but statistically insignificant. *Thomson* (*1991*) used insider loans as a ratio of total assets as a proxy for fraud and insider abuse. Using logit regression, Thomson found insider abuse positively related to bank distress. The proxy could predict distress well beyond 36 months before actual failure, the results of this research are at a variance with Thomson's findings.

From the analysis, three variables were found statistically significant in explaining the bank fragility in Kenya. The lagged dependent variable β=0.87 with p-value 0.00 confirms the lag between loan issuance and when the assets become non-performing. Besides, it confirms the decisions made today will have impact in the future. The loan growth ratio had a negative relationship meaning for the Kenyan scenario, the growth was as a result of good credits. The Loan Deposit Ratio had a good predictive ability. One of the banks that collapsed in 2015 had had LDR consistently above 100% for many years!

The loan quality ratio was statistically insignificant. However, this ratio could mean less reliance on interest income by Kenyan banks. Finally, Insider Loans were found statistically insignificant contrary to the Central Bank of Kenya onsite report on one of the banks that was distressed in the study period. Whereas insider loans did not seem a problem between 2011-2014, the Central Bank of Kenya and the external auditors found that one distressed bank had falsified records of actual insider loans before the bank was placed under receivership.

7. Conclusions and recommendations for further research

The study concludes that three of the study variables have powerful predictive powers; they are a lagged dependent variable, loan growth and loan deposit ratio. Regulatory authorities should watch the loan growth since the decrease in the variable is related to the increase in bank fragility. The regulatory authorities and policy makers must also watch a loan deposit ratio for evidence of weaknesses in the system. Inordinately high loan deposit ratios are indicative of inability to attract cheap retail deposit and therefore reliance on expensive and volatile deposit. The regulator should model monthly reporting requirements to ensure that banks are able to disclose the ratio and explain any significant positive change. Monitoring of the ratio will be able to detect reduction in customer deposits and increase in volatile and sensitive wholesale funding. It is concluded that Kenyan banks do not rely heavily on interest income. The banks showed evidence of income diversification. The insider loans variable was insignificant in explaining bank fragility contrary to the Central Bank of Kenya Bank Supervision reports. The level of NPL can act as an incentive for bank managers to seek deposits and lend more thereby exacerbating the problem. Consequently, it is recommended that any bank with NPL to gross loans greater than a regulator imposed upper limit should be dissuaded from attracting more deposits. The second policy intervention should cap the level of LDR to limit the attraction of loan capital by banking institutions thereby jeopardizing depositors' funds. In the continuing research on early warning systems, it is established that lagged non-performing loans as a ratio of gross loans, loan growth and loan deposit ratio are significant variables in determining the fragility of the banking sector in Kenya.

There is need for further studies in other jurisdiction with a high number of distressed banks to test if the three significant variables could detect the fragility of distressed institutions months or years before the distress. Besides, there is need to find out why Insider loans as defined had no significance on bank fragility.

8. Funding

This study received no specific financial support.

9. Competing interests

The authors declare that they have no competing interests.

References

Altunbas, Y., Manganelli, S., & Marques-Ibanez, D. (2015). *Realized Bank Risk during the great recession*. Available at: *www.federalresrve.gov/econresdata/ifdp/2015/files/ifdp1140.*

Alvarez-Franco, P. B., & Restrepo-Tobon, D.A. (2016). Managerial Efficiency and Failure of U.S. Commercial Banks During the 2007-2009 Financial Crisis: Was this Time Different? Ecos de Economica: *A Latin American Journal of Applied economics,* 20(43), 5-22. doi:10.17230/ecos.2016.43.1.

Baron, M., & Xiong, W. (2017). Credit Expansion and Neglected Crash Risk*. *The Quarterly Journal of Economics,* 132(2), 713–764. doi:10.1093/qje/qjx004.

Bologna, P. (2011). Is there a role for funding in explaining recent US bank failures?. *Bank of Italy Occasional Paper*, (103). Available at: https://www.imf.org/-/media/Websites/IMF/imported-full-text-pdf/external/pubs/ft/wp/2011/_wp11180.ashx.

Bologna, P. (2013). Structural Funding and Bank Failures. *Journal of Financial Services Research,* 47(1), 81–113. doi:10.1007/s10693-013-0180-4.

Boudriga, A., Taktak, N. B., & Jellouli, S. (2009). Bank supervision and non-performing loans: a cross-country analysis. *Journal of Financial Economic Policy,* 1(4), 286-318. doi:10.1108/17576380911050043.

Brownbridge, M. (1996). Government Policies and the Development of Banking in Kenya. *Institute of Development Studies at the University of Sussex,* Working Paper 29.

Brownbridge, M. (1998a). Financial Distress in Local Banks in Kenya, Nigeria, Uganda and Zambia: Causes and Implications for Regulatory Policy. *Development Policy Review, 16*, 173-188.

Brownbridge, M. (1998b). The causes of Financial distress in local banks in Africa and implications for prudential policy. *UNCTAD/OSG/DP/132.*

Bryman, A. (2012). *Social Research Methods* (4th Ed.). Oxford University Press.

Calomiris, C. W., & Mason, J. R. (2003). Fundamentals, Panics, and Bank Distress during the Depression. *The American Economic Review, 93*(5), 1615-1647. doi:10.1257/000282803322655473.

Caprio, G., & Klingebiel, D. (1997). Bank Insolvency: Bad Luck, Bad Policy or Bad Banking? *Annual World Bank Conference on Development Economics, The International Bank for Reconstruction and development/The World Bank*. Available at: https://www.researchgate.net/publication/2539996_Bank_Insolvency_Bad_Luck_Bad_Policy_or_Bad_Banking.

Carapeto, M., Moeller, S., Faelten, A., Vitkova, V., & Bortolotto, L. (2011). Distress Classification measures in the Banking Sector. *Risk Governance and Control: Financial Markets and Institutions, 1*(4), *19-30*. doi:10.22495/rgcv1i4art2.

Cecchetti, S. G., King, M.R., & Yetman, J. (2011). Weathering the Financial Crisis: Good policy or Good Luck? *Bank for International Settlement.* Working paper, 351. Available at: https://www.bis.org/publ/work351.pdf.

Clancy, D. K., & Zhao, R. (1999). A Bank Failure Prediction Model Based on Bank Operation Profile. *Asia-Pacific Journal of Accounting, 6*(2), 255-274. doi:10.1080/10293574.1999.10510565.

Cleary, S., & Hebb, G. (2016). An efficient and functional model for predicting bank distress: In and out of sample evidence. *Journal of Banking & Finance*, 64, 101–111. doi:10.1016/j.jbankfin.2015.12.001.

Cochran, J.P., Call, S.T., & Glahe, F.R. (1999). Credit Creation or Financial Intermediation?: Fractional Reserve Banking in a growing Economy. *The Quarterly Journal of Austrian Economics, 2*(3), 53-64. doi:10.1007/s12113-999-1020-0.

Cole, R. A., & White, L. J. (2011). Déjà Vu All Over Again: The Causes of U.S. Commercial Bank Failures This Time Around. *Journal of Financial Services Research, 42*(1-2), 5–29. doi:10.1007/s10693-011-0116-9.

Cucinelli, D. (2015). The impact of non-performing Loans on Bank Lending Behaviour: Evidence from the Italian Banking Sector. *Eurasian Journal of Business & Economics, 8*(16), 59-71. doi:10.17015/ejbe.2015.016.04.

Le Gall, F., Daumont, R., & Leroux, F. (2004). Banking in Sub-Saharan Africa: What Went Wrong? *IMF Working Papers, 04*(55), 1. doi:10.5089/9781451847659.001

Demirguc-Kunt, A., & Detragiache, E. (1998). The Determinants of Banking Crises in Developing and Developed Countries. *Staff Papers - International Monetary Fund, 45*(1), 81-109. doi:10.2307/3867330.

DeYoung, R., & Torna, G. (2013). Non-traditional banking activities and bank failures during the financial crisis. *Journal of Financial Intermediation*, 22(3), 397-421. doi:10.1016/j.jfi.2013.01.001.

Dungey, M., & Gajurel, D. (2015). Contagion and banking crisis – International evidence for 2007–2009. *Journal of Banking & Finance*, 60, 271–283. doi:10.1016/j.jbankfin.2015.08.007.

End, J. W. D. (2016). A Macroprudential approach to address Liquidity risk with the loan to deposit ratio. *The European Journal of Finance*, 22(3), 237-253. doi:10.1080/1351847X.2014.983137.

Federal Reserve Bank of Kansas City. (2016). *Basics for Bank Directors*. Available at: *www.bankdirectorsdesktop.org.*

Fofack, H. (2005). Non-performing loans in Sub-saharan Africa: Causal analysis and macroeconomic implications. *World Bank Policy Research Paper 3769.* Available at: *https://documents.worldbank.org/en/publication/documents-reports/documentdetail/446961468104639856/nonperforming-loans-in-sub-saharan-africa-causal-analysis-and-macroeconomic-implications.*

Gorton, G. (2018). Financial Crises. *Annual Review of Financial Economics, 10*(1), 43–58. doi:10.1146/annurev-financial-110217-022552.

Government of Kenya. (2015). *The Banking Act,* Chapter 488. Laws of Kenya. Available at: https://www.centralbank.go.ke/wp-content/uploads/2016/08/BankingActOct2015.pdf.

Government of Kenya. (1989). *Central Bank Act*, Chapter 489. Laws of Kenya. Available at: http://kenyalaw.org/kl/fileadmin/pdfdownloads/Acts/BuildingSocietiesAct_Cap489.pdf.

Granja, J., Matvos, G., & Seru, A. (2017). Selling Failed Banks. *The Journal of Finance, 72*(4), 1723–1784. doi:10.1111/jofi.12512.

Gujarati, D.N., & Porter, D.C. (2009) *Basic Econometrics*. (5th Ed.), McGraw Hill Inc., New York.

Huang, D., Chang, B., & Liu, Z. (2012). Bank Failure prediction models: for the developing and developed countries. *Journal of Quality and Quantity, 46*(2), 553-558. doi:10.1007/s11135-010-9386-9.

Jin, J., Kanagaretnam, K., & Lobo, G.J. (2018). Discretion in bank loss allowance, risk taking and earnings management. *Accounting and Finance*, 58(1), 171-193. doi:10.1111/acfi.12210.

Kedir, A. M., Iftikhar, S. F., Murinde, V., & Dia Kamgnia, B. (2018). Bank fragility in Africa: GMM dynamic panel data evidence. *Transnational Corporations Review, 10*(2), 170–178. doi:10.1080/19186444.2018.1475105.

Keele, L., & Kelly, N. J. (2006). Dynamic Models for Dynamic Theories: The Ins and Outs of Lagged Dependent Variables. *Political Analysis, 14*(2), 186–205. doi:10.1093/pan/mpj006.

Kenya Deposit Insurance Corporation, *Annual Reports 2013-2014.* Available at: http://kdic.go.ke/annual-reports.

Kolari, J., Glennon, D., Shin, H., & Caputo, M. (2002). Predicting Large US Commercial Bank Failures. *Journal of Economics and Business, 54*(4), 361-387. doi:10.1016/S0148-6195(02)00089-9.

Laeven, L. (2011). Banking Crises: A Review. *Annual Review of Financial Economics, 3*(1), 17–40. doi:10.1146/annurev-financial-102710-144816.

Logan, A. (2001). The United Kingdom's small banks' crisis of the early 1990s: What were the leading indicators of failure? *Bank of England Working paper No. 139.* doi:10.2139/ssrn.282171.

Makinen, M., & Solanko, L. (2018). Determinants of Bank Closures: Do levels or Changes of CAMEL Variables Matter? *Russia Journal of Money & Finance*, 77(2), 3-21. doi:10.31477/rjmf.201802.03.

McLeay, M., Radia, A., & Thomas, R. (2014). Money Creation in the Modern economy. *Bank of England Quarterly Bulletin,* Q1.

McLeay, M., Radia, A., & Thomas, R. (2015). La creación de dinero en la economía moderna. *Revista de Economía Institucional, 17*(33), 355-383. doi:10.18601/01245996.v17n33.16.

Messai, A. S., & Gallali, M. I. (2015). Financial Leading indicators of Banking Distress: A Microprudential Approach. Evidence from Europe. *Asian Social Science, 11*(21), 78-90. 78-90. doi:10.5539/ass.v11n21p78.

Meyer, P. A., & Pifer, H. W. (1970). Prediction of Bank Failures, *The Journal of Finance,* 25(4), 853-868. doi:10.2307/2325421.

Momparler, A., Carmona, P & Climent, F. (2016). Banking Failure Prediction: A boosting classification tree approach. *Spanish Journal of Finance and Accounting,* 45(1), 63-91. doi:10.1080/02102412.2015.1118903.

Ott, R. L & Longnecker, M. (2010). *An introduction to statistical Methods and Data Analysis*. Brooks/Cole (6thEd.). Cengage Learning.

Ozili, P. K. (2015). How bank managers anticipate non-performing loans: Evidence from Europe, US, Asia and Africa, *Applied Finance and Accounting, 1*(2), 73-80. doi:10.11114/afa.v1i2.880.

Ozkan-Gunay, E. N., & Ozkan, M. (2007). Prediction of Bank failures in emerging financial markets: an ANN approach. *The Journal of Risk Finance,* 8(5), 465-480. doi:10.1108/15265940710834753

Papanikolau, N. I. (2018). A dual early warning model of bank distress. *Economic Letters,* 162, 127-130. doi:10.1108/13581981311297803

Poghosyan, T., & Čihák, M. (2009). Distress in European banks: An analysis based on a new dataset. *IMF working papers*, 1-37. Available at: https://www.imf.org/-/media/Websites/IMF/imported-full-text-pdf/external/pubs/ft/wp/2009/_wp0909.ashx.

Rauch, C. (2010). Bank Fragility and The Financial Crisis: Evidence from the U.S. Dual Banking System, in International Banking in the New Era: Post Crisis Challenges and Opportunities. *International Finance Review, 11*, 33-86. doi:10.1108/S1569-3767(2010)0000011006.

Sarkar, S., & Sriram, R. S. (2001). Bayesian Models for Early Warning of Bank Failures. *Management Science,* 47(11), 1457–1475. doi:10.1287/mnsc.47.11.1457.10253.

Shehzad, C.T., Haan, J., & Scholtens, B. (2010). The Impact of bank ownership concentration on impaired loans and capital adequacy. *Journal of Banking & Finance,* 34(2), 399-408. doi:10.1016/j.jbankfin.2009.08.007.

Shen, C., & Chen, C. (2008). Causality Between Banking and Currency Fragility: A Dynamic Panel Model. *Global Finance Journal,* 19(2), 85-101. doi:10.1016/j.gfj.2007.11.003.

Tatom, J., & Houston, R. (2011). Predicting Failure in the Commercial Banking Industry. *Networks Financial Institute,* Working Paper №.2011-WP27. Available at: http://ssrn.com/abstracts=1969091.

Thomson, J. B. (1991). Predicting Bank failures in the 1980s. Federal Reserve Bank of Cleveland, *Economic Review,* 27(1), 9-20

Turner, A. (2012). Credit creation and social optimality, *International Review of Financial Analysis,* 25, 142-153. doi:10.1016/j.irfa.2012.09.004

Uysal, A. (2013). Assessing Accrual Quality in Financial Institutions, *PhD dissertation University of California, Berkeley*. Available at: https://escholarship.org/uc/item/1r8968gm.

Welman, J.C., & Kruger, S.J. (2001). *Research Methodology for the Business and Administrative Sciences.* Oxford University Press, Southern Africa.

Werner, R.A. (2014). Can banks individually create money out of nothing? The theories and the empirical evidence. *International Review of Financial Analysis,* 36, 1-19. doi:10.1016/j.irfa.2014.07.015.

Werner, R.A. (2016). A lost century in economics: Three theories of banking and the conclusive evidence. *International Review of Financial Analysis,* 46, 361-379. doi:10.1016/j.irfa.2015.08.014.

Whalen, G. (1991). A proportional hazards model of bank failure: an examination of its usefulness as an early warning tool. *Federal Reserve Bank of Cleveland: Economic Review,* 27(1), 21-31.

Whalen, G., & Thomson, J. B. (1988). Using financial data to identify changes in bank condition. Economic Review, 24(2), 17-26.

Wheelock, D.C., & Wilson, P.W. (2000). Why do Banks disappear? The determinants of U.S. Bank failures and acquisitions. *The Review of Economic and Statistics,* 82(1), 127-138.

Wheelock, D. C., & Wilson, P. W. (1995). *Why Do Banks Disappear: The Determinants of U.S. Bank Failures and Acquisitions*. doi:10.20955/wp.1995.013.

Wood, A., & Skinner, N. (2018). Determinants of non-performing loans: Evidence from commercial banks in Barbados. *The Business and Management Review*, 9(3), 44-64.

Zaghdoudi, T. (2013). Bank Failure Prediction with logistic Regression. *International Journal of Economics and Financial Issues*, 3(2), 537-543.

Zhang, D., Cai, J., Dickinson, D.G., & Kutan, A.M. (2016). Non-performing Loans, Moral Hazard and Regulation of the Chinese Commercial Banking System. *Journal of Banking & Finance*, 63, 48-60. doi:10.1016/j.jbankfin.2015.11.010.

Appendix A

Table A-1: Proxy of Bank Fragility*

Year	N	mean	sd	min	max
2005	33	0.4087375	0.7768731	0.0167364	4.172078
2006	34	0.2721234	0.3856532	0.0059963	1.707729
2007	34	0.2122351	0.2945185	0.0033501	1.16441
2008	36	0.1597563	0.1957502	0	0.8028391
2009	40	0.1162156	0.1345746	0	0.6267483
2010	40	0.0977027	0.1073367	0	0.4493554
2011	42	0.0896979	0.1125715	0	0.5960265
2012	42	0.0833657	0.0760755	0	0.3780146
2013	42	0.0882673	0.1086208	0	0.6784101
2014	42	0.1046848	0.1328875	0	0.7940975
2015	39	0.1096047	0.0888995	0	0.4071137
Total	424	0.1507352	0.2896993	0	4.172078

*__Source:__ compiled by the author from Stata Statistics/Data Analysis output.

Table A-2: Growth of Loan Portfolio*

Year	N	mean	sd	min	max
2005	33	0.2131825	0.2140217	-0.1630371	0.9786386
2006	34	0.213021	0.2107561	-0.1630371	0.9786386
2007	34	0.2519601	0.2824062	-0.7039372	0.9978042
2008	36	0.3711972	0.3451691	-0.1250662	1.562112
2009	40	0.2270918	0.2748775	-0.1883741	1.562112
2010	40	0.2599354	0.1968056	-0.068375	0.6502594
2011	42	0.4116382	0.492529	0.0893787	3.334437
2012	42	0.2443357	0.5162727	-0.1799585	3.334437
2013	42	0.2779468	0.3017702	0.0093115	1.910619
2014	42	0.2144532	0.1802936	-0.1512667	0.6589835
2015	39	0.2154551	0.4496083	-0.1848745	2.723433
Total	424	0.2649128	3424105	-0.7039372	3.334437

*__Source:__ compiled by the author from Stata Statistics/Data Analysis output.

Table A-3: Loan Deposit Ratio*

Year	N	mean	sd	min	max
2005	33	0.7341218	0.2766879	0.2789369	1.49235
2006	34	0.6854252	0.2048741	0.2990568	1.197418
2007	34	0.6971794	0.2449538	0.2258798	1.557511
2008	36	0.7335653	0.2336494	0.2611004	1.563182
2009	40	0.7084006	0.2926496	0	2.004624
2010	40	0.6639429	0.1895773	0.2021739	1.316728
2011	42	0.7227055	0.1846156	0.3912855	1.419091
2012	42	0.7063401	0.1880586	0.3004646	1.310066
2013	42	0.7600754	0.2112341	0.3181635	1.562456
2014	42	0.7697374	0.2129954	0.2052573	1.639842
2015	39	0.802096	0.1460029	0.4293477	1.03243
Total	424	0.7266285	0.2198255	0	2.004624

*__Source:__ compiled by the author from Stata Statistics/Data Analysis output.

Table A-4: Loan Quality*

Year	N	mean	sd	min	max
2005	33	0.4882343	0.1135493	0.1025641	0.6630435
2006	34	0.4775237	0.0832258	0.293578	0.6396761
2007	34	0.4698134	0.0949192	0.1084337	0.6398467
2008	36	0.47167	0.0819143	0.2827225	0.6449865
2009	40	0.4752037	0.1086106	0.2406417	0.7692308
2010	40	0.4425364	0.1196403	0.1871508	0.6845361
2011	42	0.4603842	0.1195319	0.1791383	0.6973684
2012	42	0.3754972	0.1644486	0.0128168	0.6723744
2013	42	0.4714465	0.1090485	0.2572081	0.6862327
2014	42	0.448489	0.1122881	0.1553398	0.6792123
2015	39	0.4399926	0.11167	0.1708075	0.6492212
Total	424	0.4549881	0.1165592	0.0128168	0.7692308

*__Source:__ compiled by the author from Stata Statistics/Data Analysis output.

Table A-5: Insider Loans*

Year	N	*mean*	*sd*	*min*	*max*
2005	33	0.0484101	0.0972467	0.0053989	0.5411552
2006	34	0.0460712	0.1001267	0.0062645	0.5966282
2007	34	0.0305265	0.0262466	0.0046404	0.1294629
2008	36	0.0294487	0.0255902	0.0034999	0.1387994
2009	40	0.0311615	0.0311458	0	0.1863853
2010	40	0.0301898	0.0257053	0	0.1434271
2011	42	0.0279721	0.0194431	0.0012477	0.0893372
2012	42	0.0326445	0.0310684	0.0012059	0.1838235
2013	42	0.0312339	0.0231369	0.0010416	0.1252847
2014	42	0.0327975	0.0268342	0.0014548	0.147168
2015	39	0.030574	0.0219513	0.0013282	0.1016804
Total	424	0.0333577	0.045707	0	0.5966282

*__Source:__ compiled by the author from Stata Statistics/Data Analysis output.

Table A-6: Non-Performing Loans to Total Assets*

Year	N	*mean*	*sd*	*min*	*max*
2005	33	0.1870357	0.2666168	0.0075973	1.026731
2006	34	0.1357565	0.1920376	0.0030345	0.9315948
2007	34	0.0934425	0.1182658	0.0019366	0.490285
2008	36	0.081946	0.1017988	0	0.4197682
2009	40	0.0629958	0.0831811	0	0.4492481
2010	40	0.0484044	0.0537299	0	0.2604055
2011	42	0.0428235	0.0447897	0	0.228411
2012	42	0.0434899	0.045313	0	0.2608359
2013	42	0.0520122	0.0787318	0	0.5131534
2014	42	0.0636486	0.1045178	0	0.6607653
2015	39	0.064975	0.055702	0	0.2341396
Total	424	0.0763867	0.1228863	0	1.026731

*__Source:__ compiled by the author from Stata Statistics/Data Analysis output.

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Market innovation and competitive advantage of telecommunication companies in Kenya

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Research question. To survive, organizations must have a competitive advantage in order to stay ahead of the competition. Market innovation has remained the driving force behind most market expansions and stability in the turbulent nature of global economies. The research question for the study thus was, "do market innovations influence the competitive advantage of telecommunication companies in Kenya?"

Design/Method/Approach. Using the philosophy of positivism, the study adopted an explanatory research design in testing the hypothesis. The main data collection instrument was a structured questionnaire using both physical conduct and online interactions to return 247 responses from mid and top level managers in a total of 26 active telecommunications companies in Kenya. The study used both descriptive and inferential statistics using SPSS computer application to analyze the data.

Findings. The study findings established that innovative distribution channels significantly influenced the competitive advantage of telecommunication companies in Kenya, while advertising and promotions did not have a significant influence. This led to the conclusion that market innovation has a significant influence on the competitive advantage of telecommunication companies in Kenya.

Practical implications. The study recommends that telecommunication companies need to form collaborations and partnerships for establishing market distribution channels that have indicated to bring influence onto the competitive advantage of the companies. Other recommendations include a wider coverage of the East African market for the telecommunications sector. The study provides insights into new companies with interest in the region.

Originality/Value. From the results, marketing and promotions are not the only major contributing factors in the competitive advantage of telecommunication companies in Kenya; one must consider distribution channels too.

Research limitations/Future Research. The study faced limitations on visiting the field during the COVID-19 pandemic period, thus encountering entry restrictions into various premises. All protocols were observed to overcome that obstacle. Some of the telecommunications companies were facing difficulties in operations and hence could not participate.

Paper type. Empirical

Keywords: competitive advantage; market innovation; distribution channels; telecommunications industry; advertising.

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Ринкові інновації та конкурентні переваги телекомунікаційних компаній в Кенії

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Дослідницьке питання. Для виживання на ринку організації повинні мати конкурентну перевагу, щоб випереджати конкурентів. Ринкові інновації залишаються рушійною силою більшості ринкових розширень і стабільності в умовах турбулентності світової економіки. Ключе питання цього дослідження: «Чи впливають ринкові інновації на конкурентні переваги телекомунікаційних компаній у Кенії?».

Дизайн/Метод/План дослідження. Використовуючи філософію позитивізму, в дослідженні прийнято пояснювальний дослідний дизайн для перевірки гіпотези. Основний інструмент збору даних – структурована анкета, яка передбачала як особисте, так й інтерактивне спілкування. Отримано 247 відповідей від менеджерів середньої і вищої ланки в 26 діючих телекомунікаційних компаніях у Кенії. Застосовано як описову, так і логічну статистику з використанням комп'ютерної програми SPSS для аналізу даних.

Результати дослідження. Встановлено, що інноваційні канали збуту істотно впливають на конкурентну перевагу, в той час як реклама і рекламні акції не мають істотного впливу. Це дозволяє зробити висновок, що ринкові інновації суттєво впливають на конкурентні переваги телекомунікаційних компаній в Кенії.

Практичне значення дослідження. Цим дослідженням рекомендовано телекомунікаційним компаніям налагодити співпрацю і партнерство для спрощення створення каналів збуту на ринку, які, як виявилося, можуть впливати на конкурентні переваги компаній. Крім цього, рекомендовано розширити охоплення східно-африканського ринку телекомунікаційного сектора. Надано уявлення про нові компанії, які проявляють інтерес до регіону.

Оригінальність/Цінність/Наукова новизна дослідження. Дослідженням доведено, що маркетинг і просування – не тільки найважливіші фактори, що сприяють досягненню конкурентної переваги, але й канали поширення.

Обмеження дослідження/Перспективи подальших досліджень. Дослідження зіткнулося з обмеженнями щодо необхідності відвідувати місця в період пандемії COVID-19, що призвело до обмежень входу в приміщення. Всі протоколи були дотримані, щоб подолати цю перешкоду. Деякі телекомунікаційні компанії зіткнулися з труднощами в роботі і, отже, не могли брати участь.

Тип статті. Емпіричний.

Ключові слова: конкурентні переваги; ринкові інновації; канали розподілу; телекомунікаційна галузь; реклама.

Рыночные инновации и конкурентные преимущества телекоммуникационных компаний в Кении

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Исследовательский вопрос. Для выживания на рынке организации должны иметь конкурентное преимущество, чтобы опережать конкурентов. Рыночные инновации остаются движущей силой большинства рыночных расширений и стабильности в условиях турбулентности мировой экономики. Ключевой вопрос данного исследования: «Влияют ли рыночные инновации на конкурентное преимущество телекоммуникационных компаний в Кении?».

Дизайн/Метод/План исследования. Используя философию позитивизма, в исследовании принят объяснительный исследовательский дизайн для проверки гипотезы. Основной инструмент сбора данных – структурированная анкета, в которой использовались как личные контакты, так и интерактивное общение. Получено 247 ответов от менеджеров среднего и высшего звена в 26 действующих телекоммуникационных компаниях в Кении. В исследовании использовалась как описательная, так и логическая статистика с использованием компьютерного приложения SPSS для анализа данных.

Результаты исследования. Установлено, что инновационные каналы сбыта существенно влияют на конкурентное преимущество, в то время как реклама и рекламные акции не имеют существенного влияния. Это привело к выводу, что рыночные инновации оказывают значительное влияние на конкурентные преимущества телекоммуникационных компаний в Кении.

Практическое значение исследования. Этим исследованием рекомендовано телекоммуникационным компаниям наладить сотрудничество и партнерство для упрощения создания каналов сбыта на рынке, которые, как выявилось, могут оказывать влияние на конкурентные преимущества компаний. Кроме того, рекомендовано расширить охват восточноафриканского рынка телекоммуникационного сектора. Дано представление о новых компаниях, проявляющих интерес к региону.

Оригинальность/Ценность/Научная новизна исследования. Исследованием доказано, что маркетинг и продвижение – не только важнейшие факторы, способствующие достижению конкурентного преимущества, но и каналы распространения.

Ограничения исследования/Перспективы дальнейших исследований. Ограничения исследования связаны с необходимостью посещать места в период пандемии COVID-19, что привело к ограничениям входа в помещения. Все протоколы были соблюдены, чтобы преодолеть это препятствие. Некоторые телекоммуникационные компании столкнулись с трудностями в работе и, следовательно, не могли участвовать.

Тип статьи. Эмпирический.

Ключевые слова: конкурентное преимущество; рыночные инновации; каналы сбыта; телекоммуникационная отрасль; реклама.

1. Introduction

Companies, irrespective of their industry affiliation, recognize competitive advantage as a superior position firms hold, relative to their rivals, throughout their internal and external firm activities (*Trubnikov, 2019*). Each firm establishes its own competitive niche depending on the conditions that allow it to be productive within that specific niche. Typical competitive advantages within this study's context includes marketing, research and development, distribution network, customer service, branding, and intellectual property among other activities. To maintain the competitive advantage, firms establish competitive sustainability to make it difficult for rival firms to neutralize the advantage on a specific market (*Ben-Hassine, 2019*).

Market innovation is an additional dimension of modernization that is thought of as the efforts and resources concentrated to new sales methods in business. From the point of view of market observers, such innovations typically remain key in a competitive advantage for organizational market sustenance *(Medrano & Olarte-Pascual, 2016*).

Innovations give a springboard to cost and differentiation strategies as used by the most competitive players on the market especially in the telecommunications sector. As pointed out by *Sitanggang and Absah* (*2019*), the two strategies of cost leadership and differentiation could separately lead to reduced competition and product or service sustainability, creating more capital for a market share increase. Once a competitor establishes a stronghold of any innovation, the best strategy amongst these two will test the sustainability of those innovations on the market as attested by *Bayraktar et al.* (*2017*).

2. Theoretical background

There is clear evidence that competitive advantage is a function of innovativeness especially in terms of market position as opposed to the traditional scientific innovativeness of products or technologies (*Anning-Dorson, 2018*). Due to the heavy investment required to build a market, firms strictly keep tight but strict budgets for research and development to sustain both present and future markets (*Quaye & Mensah, 2019*).

To sustain a high level of market innovativeness for competitive advantage requires an economy full of entrepreneurship. Major examples of countries with high entrepreneurial marketing skills include the USA, Japan, China, and Germany who have many businesses in the global market, thus maintaining a sustainable competitive advantage (*Sutapa et al., 2017*). Every marketing innovation might not lead to an advantage, but through the main strategies of cost leadership and differentiation, the competitive advantage becomes achievable (*Anning-Dorson et al., 2018*).

High-level creativity, quality services, segmentation, customization, efficient distribution channels, and meeting customers' different needs, characterize both strategies. There are three main sources of the competitive advantage for both cost leadership and differentiation strategies. These include technological innovations, skillful human resources and the organizational structure of the firm (*Porter & Kramer, 2019*). However, this is only possible if the firm has a strong internal system of training and development of staff, while providing motivation at the same time. This can be achieved through easy learning systems, open appraisals, human resource best practices, employment security, and employee participation that empowers innovative action (*Aghion et al., 2019*).

As an innovative industry emerges, performance-driven antagonism may be wild with the end goal that organizations can't bear to expect measured designs because of the aggressive and competitive nature of the industry (*Muthu & Thangavelu, 2019*). This study specifically chose the resource-based view theory as it resonates with market innovations that have defined the market in the telecommunications industry. An innovative market is a form of a disruptive innovation that is easily identified with customers of a given firm, on a specific market.

2.1. Market innovation and competitive advantage

Market innovation has been driven by intense competition by companies trying to create a niche in the market for their products and services. According to *Sun and Lee* (*2013*), the innovations that involve both designing and technology enhancement present new products and services geared towards a specific market and this continues to sustain the universal drive for innovation.

There is strong evidence that innovations focus on the market aspect. A European study by *Asimakopoulos and Whalley* (*2017*) brought out the link between market leadership and the moderating effect of technological progress relating to mobile firm performance. Based on technological forecasting theories, the study explored the competitive advantage posed by those firms that aim to be market leaders while riding on technological innovations. The study used a 2-stage analytical design by first applying Data Envelopment Analysis (DEA) to measure performance in the telecommunication industry across Europe. In the next stage of the analysis, the study bootstrapped the DEA estimates through truncated regression to test the hypothesis. The results from the analysis leads the researchers to conclude that market leadership is a strong factor in a competitive advantage while the moderation of technological innovations can easily derail that leadership and even lead to the loss of market leadership in the European mobile telecommunication industry (*Nashiruddin, 2019*).

Lin, Lu and Chen (*2018*) carried out a study on the telecommunication market. Their focus was on the market competition and regulating reforms as they relate to technological innovations in the telecommunications industry. The study empirically examined datasets using a time series analysis from 122 countries in the period, 2010 to 2015, with the aim of establishing the relationship between market leadership, government regulation, and the moderating effect of technological innovations. *Lin et al.* (*2018*) established that technological innovations without market leadership cannot improve the performance of telecommunication firms. They cite regulation, industry market competitive advantage and the pursuit of privatization as a key in determining the competitive advantage of these firms. *Berne et al.* (*2019*) recommend the strengthening of regulatory authorities in collaboration with privatization exercises in order to protect markets from technological innovations that are costly but do not add any value to the market.

Promotional marketing in the telecommunications industry has grown to large-scale activities. The study carried out by *Yeboah-Asiamah et al.* (*2016*) focuses on the sales promotion that telecommunication companies activate in Ghana, West Africa. The study focuses on brand loyalty and the market innovation of lucky draw sales promotion (LSDP). Using a descriptive design, the study targets at a population of all lucky draw winners in Upper Accra region of Ghana using a structured questionnaire, a sample of 338 respondents via a convenient approach. *Yeboah-Asiamah et al*. (*2016*) uses structural equation modeling for analyzing the data in which the results indicate that LSDP strongly related to brand loyalty in the market. The study further applies a 4-stage process to determine the brand loyalty aspects that are influenced by LSDP. The study results indicate that market innovations like LSDP have a strong influence on the competitive advantage of a firm. Similar results are reflected in neigboring Nigeria where *Rejoice et al.* (*2019*) established that corporate imaging is a strong market competitive advantage.

Specific marketing firms affect the competitive advantage of the telecommunication industry locally. The study by *Adede et al.* (*2017*) focuses on electronic marketing known as e-commerce that relates to the telecommunication industry in Kenya. Anchored in the diffusion of innovations as well as the wheel of retailing theory, the study applies a descriptive design approach targeting at all telecommunications companies in Kenya. *Adede et al.* (2017) utilize a semi-structured questionnaire to collect primary data and extract secondary data from company reports and statistical abstracts. The study analyzes data through the factor analysis and regression modeling producing the results that indicate a strong relationship between e-marketing and industry performance. Compared to the studies carried out by *Njeru and Kariuki* (*2019*), these results equally reveal that the competitive environment of the telecommunication industry moderates strongly between the performance and e-commerce aspects. This implies that the telecommunications industry should be keen on the e-commerce practice while ensuring that competiveness is well maintained. In conclusion, *Adede et al.* (*2017*) indicate that there is a possibility of a firm failing to perform on the market even if they have some excellent e-marketing platforms or if they do not have any competitive advantage. This is also comparable to the study by *Laban and Deya* (*2019*), highlighting the strategic approach to marketing that focuses on innovation for competitive advantage in marketing of the telecommunications industry. In order to achieve the expected outcome, the current study seeks to find out the distribution channels and promotional and advertising activities in the telecommunications industry using a Likert scale to a structured questionnaire as shown in *Fig. 1*.

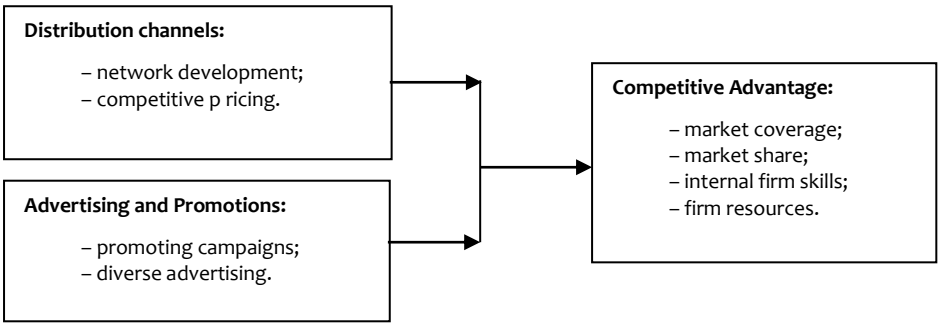

Figure 1: Conceptual framework of market innovation and the competitive advantage of telecommunication companies in Kenya*

**Source:* developed by the authors.

3. Research question

To survive, organizations must have a competitive advantage in order to stay ahead of the competition. Market innovation has remained the driving force behind most market expansions and stability in the turbulent nature of global economies. The research question for the study thus was, "do market innovations influence the competitive advantage of telecommunication companies in Kenya?" Specific questions guiding the study were:

Q1: Do distribution channels have a significant influence on the competitive advantage of telecommunication companies in Kenya?

Q2: How do marketing promotions and advertisements influence the competitive advantage of telecommunication companies in Kenya?

4. Methods and data

The research methodology section covers the philosophy approach, the research design used, the population, the sample selection, the research procedure, and data analysis methods.

For the purpose of testing the study hypothesis, the variables are operationalized with various dimensions and indicators as shown in *Tab. 1*.

Table 1: Operationalization of marketing variables and hypothesis testing*

Variables	Dimension	Indicator	Key Authors
Independent Variables			
Distribution Channels (X_1)	Procedural	Distribution methods Cost of channels	*Asimakopoulos and Whalley* (*2017*)
Advertising & Promotions (X_2)	Promotions	Customer involvement Market aggressiveness	*Lin et al.* (*2018*)
Dependent Variable			
Competitive Advantage (Y)	Cost leadership & differentiation	Market coverage Market share Internal firm skills Firm resources	*May and Schedelik* (*2019*)

**Source:* completed by the authors.

4.1. Philosophical approach

The study adopted a positivist approach philosophy. Vouching for positivism, as a rejection of inputs of the observer or unmeasurable world aspects, the aim is to portray this philosophy in a position that holds that the goal of knowledge is simply to describe the phenomenon that is experienced (*Dougherty et al., 2019*).

4.2. Research design

Kothari (*2014*) describes a research design as the conceptual structure within which the research is conducted, it makes up the outline of the data collection, measurement and analysis. This study utilizes the explanatory research design by *Cooper and Schindler* (*2014*), since it is useful in establishing the relationship between variables.

4.3. Population and sample selection

The target population comprised all 26 telecommunication companies licensed by the Communications Authority in 2018. Based on the market share, ten companies had a market share of more than 97.5%, while the remaining ones had less than 2.5% of the telecommunications market share in Kenya. The sampling frame comprised 26 telecommunication companies targeting the management employees of these telecommunications companies. In 2019, the total number of employees in the telecommunications industry in Kenya was 8,689 (*CA Report, 2019; KNBS, 2020*). The total number of managers in each company varied and the company with a clear percentage of managers was Safaricom at 17.6% (*Safaricom Report, 2019*). The researcher worked with 30% of the total population and the sample size was calculated using the Cochran formula in two steps.

$$n_0 = \frac{Z^2 pq}{e^2} \quad (1),$$

where:

n_o – Cochran's sample size;
e – the desired level of precision (5% margin of error);
p – the (estimated) proportion of the managers to the population is 30%;
q – $(1–p)$.

In our case, Cochran's sample size:

$$n_0 = \frac{1.96^2 \cdot 0.3 \cdot 0.7}{0.05^2} = 322.69$$

To obtain a higher confidence level, this equation was used to modify the sample size:

$$n = \frac{n_0}{1+\frac{(n_0-1)}{N}} \quad (2),$$

where:

n_o – Cochran's sample size (322.69);
N – the population size of the telecommunication industry (8,689);
n – the adjusted sample size.

In our case, adjusted sample size:

$$n = \frac{322.69}{1+\frac{(322.69-1)}{8689}} = 311$$

4.4. Data collection tools

A structured questionnaire was used to collect data from the managers. The questionnaire had demographic information and two constructs representing market innovations, that is, promotions and advertising as well as distribution channels.

4.5. Pilot study

The study conducted a pilot survey prior to the full field visit in which 14 respondents from the companies participated and were subsequently removed from the main field study. This pilot study ensured the test of reliability and validity. The reliability test had Cronbach's alpha of more 0.9 indicating good reliability (*Cooper & Schindler, 2014*). The content validity was attained by subject experts who evaluated the questionnaire and were satisfied with the content while the construct validity was attained by Average Variance Extracted (AVE) test which had of more 0.5 threshold indicating the constructs account for at least fifty per cent of the variance in the items.

A linear regression analysis model was used to test the research hypothesis. The model was appropriate in order to get the relation between dependent and independent variables.

Main hypothesis:

H_o: Market innovations have no significant influence on the competitive advantage of telecommunication companies in Kenya.

The two sub-hypotheses as outlined on the conceptual framework are:

H_{o1a}: Distribution channels have no significant influence on the competitive advantage of telecommunication companies in Kenya.
H_{o1b}: Marketing promotions and advertisements have no significant influence on the competitive advantage of telecommunication companies in Kenya.

5. Results

Field visits to 26 telecommunications companies in Kenya yielded the data that was run through various analysis systems. The results of the findings are presented as follows: demographic information of the respondents, the descriptive statistics, the factor analysis, the correlational analysis and the regression analysis. The main aim of all the above tests was to lead to the conclusion that would eventually enable testing of the study hypothesis. Although various methods could have been used, the most viable quantitative technique used in analyzing statistical variables was regression analysis. The aim of this method generally is to explain or predict a value using known or unknown variables. The regression analysis compares and produces the results of both independent as well as dependent variables. In order to have the results for both, there is a representation given as R^2, which represents the coefficient of multiple determination. This determination is the exact proposition of the variation between the dependent variable Y and its explanation of the independent variables. Under normal circumstances, this R^2 value is adjusted to explain the multiple regression results.

5.1. Demographic Information

A proportionate sampling yielded 247 responses, out of the 311 questionnaires sampled, from mid and top-level managers in 26 telecommunication companies in Kenya. That was 79.4% of the target respondents. The total respondents were 56% male participants and 44% female participants. This shows a 50% gender balance in the management team in the telecommunications industry.

Most managers in the telecommunications industry were aged between 24-35 years at 32%, followed by those aged 36-45 years at 26%, below 25 years old was at 15%, 46-55 year-olds was at 10% and those over 55 years were the least at 1%.

Cumulatively, more than half of the managers were aged between 25-45 years at 58%. Uniquely, 15% of the managers were below 25 years old, which is different in other industries.

5.2. Descriptive statistics

As indicated in *Tab. 2*, the independent variable has two sets of questions (the second order constructs): distribution channels, advertising and promotions. The mean of the distribution channels constructs is 3.7 which, if rounding to zero decimal places, is 4 (*M*=4).This shows that the managers 'agreed' on all the questions regarding distribution channels. Further, the standard deviation (*SD*) value of all the questions is <1 and the skewness (*Skw*) is negative. The mean of the marketing promotions and advertisements constructs is 3.8 which, if rounding to zero decimal places, is 4 (*M*=4). This shows the managers 'agreed' on all the questions regarding marketing promotions and advertisements.

Further, the standard deviation (*SD*) value of all the questions is <1 and the skewness (*Skw*) is negative. This shows a high level of consensus among the respondents on the level of agreement regarding the 'marketing promotions and advertisements' constructs.

Table 2: Mean and standard deviation of market innovation constructs (distribution mid and advertising MIA)*

	N	Mean	Std. Deviation	Skewness	Std. Error of Skewness
MID	247	3.6977	0.44724	-0.487	0.155
MIA	247	3.8731	0.69915	-0.452	0.155

*__Source:__ calculated by the authors.

5.3. Inferential statistics

The main focus of inferential statistics is to cement the findings in the initial analysis using descriptive statistics. This enables further insights into the analytical approach to the study findings thus necessitating inferential statistics. It also provides real predictability of the population and in particular the determination of occurrence of a phenomenon by chance or design. This study in particular heavily relies upon the inferential statistics since the nature of innovation plays a big role in the basic design of destructive changes.

5.4. Factor analysis on market innovation

An exploratory factor analysis (EFA) is performed using the principal component analysis. The exploratory factor analysis is performed to: extract the pattern matrix that informs the viability of constructs included in the study; identify the questions on each matrix; and determine the strength of sampling adequacy. The questions that do not apply to the matrix are dropped.

As indicated in *Tab. 3*, the Kaiser-Meyer-Olkin of sampling adequacy is 0.646. Bartlett's test of Sphericity is significant at $X^2(15, N=247)=394.316$, $p<0.05$. This output shows the independent variable factors are adequate for extraction since Kaiser-Meyer-Olkin measure is greater than 0.6 and Bartlett's test is significant ($p<0.05$).

Table 3: Test of KMO and Bartlett's on market innovation*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.646
Bartlett's Test of Sphericity	Approx. Chi-Square	394.316
	Df	15
	Sig.	0.000

*__Source:__ calculated by the authors.

5.5. Correlation analysis

The correlation test is conducted to test the significant relationship between market innovations as the independent variable and competitive advantage as the dependent variable. As indicated in *Tab. 4*, there is a statistically significant correlation between the independent variable constructs distribution channels, and advertising and promotions $r(247)=0.164$, $p<0.05$.

On the relationship between the independent variable constructs and the dependent variable, there is a significant relationship between the distribution channels and competitive advantage $r(247)=0.236$, $p<0.05$. However, there is no significant correlation between advertising and promotions and competitive advantage $r(247)=0.114$, $p>0.05$.

Table 4: Correlation between market innovation and competitive advantage*

		Distribution channels	Advertising and promotions	Competitive advantage
Distribution channels	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	247		
Advertising and promotions	Pearson Correlation	0.164**	1	
	Sig. (2-tailed)	0.010		
	N	247	247	
Competitive advantage	Pearson Correlation	0.236**	0.114	1
	Sig. (2-tailed)	0.000	0.075	
	N	247	247	247

*__Source:__ calculated by the authors.
**__Note:__ correlation is significant at the 0.01 level (2-tailed).

5.6. Heteroscedasticity test of market innovation and competitive advantage

As indicated in *Fig. 2*, the scatterplot output shows the spots are concentrated within a specific area forming a pattern. It shows a higher level of similarity on the distribution of market innovation as the independent variable and competitive advantage as the dependent variable hence homogenous. In the regression model, a market innovation fits to predict the competitive advantage.

5.7. Regression Analysis

Tab. 5 shows the model summary results. The output indicates that the influence of market innovation on the competitive advantage of telecommunication companies in Kenya is statistically significant, $R^2=0.047$, $F(1, 245)=13.251$, p-value<0.05. This shows that 4.7% of the competitive advantage of telecommunication companies in Kenya is attributed to market innovation while the remaining 95.3% can be attributed to other factors not included in the study and the error term.

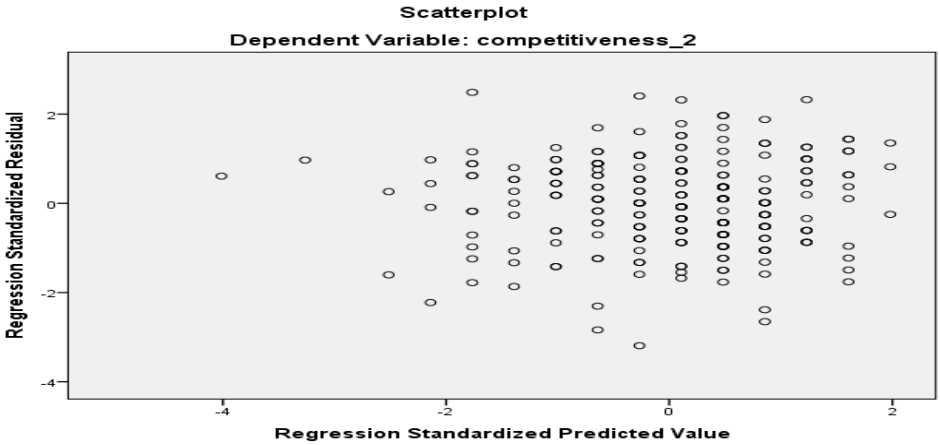

Figure 2: Heteroscedasticity of Market Innovation on Competitive Advantage*

**Source:* built by the authors based on their own calculations.

Table 5: Model summary*of market innovation on competitive advantage**

Model	*R*	*R* Square	Adjusted *R* Square	Std. error of the Estimate	Change statistics				
					R square change	*F* change	df1	df2	Sig. *F* change
1	0.227***	0.051	0.047	0.41680	0.051	13.251	1	245	0.000

**Note:* Predictors: (Constant), Market innovation.
***Source:* calculated by the authors.
****Note:* Dependent variable: Competitive advantage.

5.8. Regression coefficient of market innovation on competitive advantage

As indicated in *Tab. 6*, the market innovation significantly predicts the competitive advantage of the telecommunications companies in Kenya (β=0.227, t=3.640, p<0.05). This specific result leads to the rejection of the null hypothesis and the acceptance of the alternative hypothesis that market innovation has a significant influence on the competitive advantage of telecommunication companies in Kenya.

The study derives the model for market innovation and competitive advantage based on a simple regression model:

$$Y = \beta_0 + \beta_i x_i + \varepsilon \quad (3),$$

where:

Y – competitive advantage;
β_0 – constant;
β_i – market innovation;
ε – error term.

In our case:

$$Y=2.644+0.227X+0.060$$

The model shows that the unit increase in the market innovation increases the competitive advantage of the telecommunications companies in Kenya by 0.227. The study, thus, rejects the null hypothesis and accepts the alternate hypothesis of the study that market innovation has a significant effect on the competitive advantage of telecommunication companies in Kenya.

Table 6: Market innovation regression coefficient* on competitive advantage**

Model		Unstandardized Coefficients		Standardized Coefficients	*T*	Sig.
		B	Std. Error	Beta		
1	(Constant)***	2.644	0.228		11.614	0.000
	Market innovation***	0.217	0.060	0.227	3.640	0.000

**Note:* Dependent variable: Competitive advantage.
***Source:* calculated by the authors.
****Note:* Predictors: (Constant), Market innovation.

The qualitative themes that emerge from the study are teamwork and marketing strategy. In teamwork, the key aspects are creativity, awareness of market forces, increase in a customer base, strong market skills, expansion of a marketing team, good leadership on the marketing team, use of a special marketing team and market positioning.

As for the strategy used, the aspects listed are: adequate marketing adoption, synergies in the industry, smart advertising, flexibility on the cost and marketable plans, aggressive marketing, and flexible bright marketing ideas. Other strategies include positive impact on the society, and establishing a strong brand in the industry. This indicates that companies employ various strategies to remain competitive in the market.

Main hypothesis of study: H_0: Market innovation has no significant influence on the competitive advantage of telecommunication companies in Kenya.

The two sub-hypothesis based on the two constructs of the study as outlined on the conceptual framework are:

H_{01a}: Distribution channels have no significant influence on the competitive advantage of telecommunication companies in Kenya.

H_{01b}: Promotions and advertisements have no significant influence on the competitive advantage of th telecommunication companies in Kenya.

Tab. 7 shows the model summary of the hypothesis. The output indicates that the unit influence of distribution channels on competitive advantage is 2.7% (R^2=0.027, p<0.05) and the unit influence of promotions and advertisements on competitive advantage is 3.3% (R^2=0.033, p<0.05). In each model, the unit summary is less than 5%. The linear regression of the combined constructs to present the market innovation shows that the unit influence of market innovation on competitive advantage is 9.1% (R^2=0.091, $F(1, 245)$=24.521, p<0.05). However, the unit of influence is less than 10%.

To sum up, the regression model shows that the market innovation significantly predicts the competitive advantage of telecommunication companies in Kenya (β=0.227, t=3.640, p<0.05). It shows that a unit increase in the market innovation increases the competitive advantage of the telecommunication companies in Kenya by 0.227. From this, the null hypothesis of the study is rejected and the research concludes that market innovation has a significant influence on the competitive advantage of telecommunication companies in Kenya.

Table 7: Model Summary of Independent Variable on Competitive Advantage*

	Distribution Channels	Advertising & Promotions	Competitive Advantage
R	0.164	0.182	0.156[c]
R Square	0.027	0.033	0.024
Adjusted R Square	0.023	0.029	0.02
Std. Error of the Estimate	0.42215	0.42079	0.42265
R Square Change	0.027	0.033	0.024
F Change	6.743	8.381	6.146
df1	1	1	1
df2	245	245	245
Sig. F Change	0.01	0.004	0.014

*__Source:__ calculated by the authors.

6. Discussion

The key research question produces the results that reject the hypothesis *H_0: market innovation has no significant influence on the competitive advantage of telecommunication companies in Kenya*. It has the implication that market innovation has an influence on the competitive advantage of telecommunication companies in Kenya. The results of this study are also in agreement with previous studies carried out by others. *Asimakopoulos and Whalley* (2017) found that market leadership was key to acquiring a stable competitive advantage. This is an opportunity for such a firm to have a stronghold of the market in terms of a customer base and retained branch shares. Market innovations, thus, improve the position of the firm's competitive advantage at all levels. Similarly, *Lin et al.* (*2018*) support the proposition that market innovation is a disruptive design that can ensure firms' competitive advantage. Specifically, there is an observation of a marketing innovation strategy that includes various aspects like learning orientation as well as firm entrepreneurship while observing research and development innovation strategies. In essence, this leads to marketing performance. As observed in other studies, a firm can have influence of new product development with customer responsiveness leading to marketing effectiveness and marketing advantage (*Wonyra, 2018*). The scholars also established that market performance was greater in the companies with high innovations and those firms, which aimed at understanding the strategies employed by leading firms in the market. The scholars recommended that as markets transform and grow, organizations should be able to design the strategy that will be appropriate for their market in order to maintain their competitive positions. Locally, there are scholars who also support the view that market innovations play a key role in influencing the competitive advantage of a firm. *Adede et al.* (*2017*) in their study conclude that development techniques and e-commerce play an important role in the market innovativeness of a firm. When the two are well developed, the innovative market will lead to the competitive advantage of the firm.

On the contrary, there are scholars whose study results are contrary to the findings of the current study. *Yeboah-Asiamah et al.* (*2016*) established that market innovations can only work in specific zones and that not all firms understand the best market for their products as found in the study focusing on a specific area of Ghana. This has the implication that market innovations cannot be a guarantee for a competitive advantage unless the firm completely gets its bearings correct in the market. It also means that the market is not easy to manipulate through innovativeness due mainly to costumers' loyalty over the long term. The scholars for the Ghana study also point out in their conclusions that market innovations are only applicable to specific products and services. *Lin et al.* (*2018*) criticize the reliance on market innovations as temporary in measure since customers especially in the telecommunication companies' market are very sensitive to other features including technology and the actual product that the market is offering. The scholars add that people's peculiar habits can also make it difficult for any market innovativeness to work. This implies that innovative markets will not change the perception of the consumers and hence no competitive advantage will be achieved in the short- or long-term.

In terms of theory, several scholars including *Anning-Dorson* (*2018*) and *Sutapa et al.* (*2017*) theorize that the key to any market competition by an organization in the face of innovations is not to protect itself, but to fully face the innovative changes. This is a fair practice and it requires collaborations and partnerships with a view to sharing innovations in one way or another in the face of stiff competition amongst the industry players. The key issue according to *Bansal et al.* (*2019*) is how this market accommodates the innovations; meaning that individual companies cannot shy away from adopting the introduced innovations.

7. Conclusions

General study findings indicate that the market innovation has a significant influence on the competitive advantage of the telecommunications companies in Kenya. There are cases in the telecommunications companies in Kenya where specific markets are meant for specific clients but in general, all types of markets in Kenya remain active due to the good marketing strategies employed by the dominant firms on respective markets. The low-end markets catering for low-income earners use the technological innovations to keep their low-end markets very active. Similarly, the high-end markets remain vibrant following incentives that keep their customers happy. The study observes that both markets make specific telecommunication companies remain on top of their group and hence the intensity of maintaining the markets remains high. It is, therefore, fair to conclude that the market innovation of the telecommunication companies in Kenya maintains a strong push in retaining competitive advantage most of the time.

7.1. Recommendations and Implications on Policy, Limitations, Theory and Practice

As indicated in the study findings, market innovation has an influence on the competitive advantage of telecommunication companies in Kenya. From the findings, it is recommended that players in the telecommunications industry can work in cohesion to better understand the Kenyan market and thus avoid the collapse of smaller or larger firms as has happened to some. It is also suggested that there can be a partnership of firms in the market together with the government in opening up regional markets instead of each firm seeking its new market in the very competitive telecommunication companies' market in the East African region. There is also a positive suggestion that the government should continue sponsoring students especially, in the study of technology markets, to the countries that are very advanced including, the Tiger nations of Korea, Hong Kong, Taiwan, as well as both European and the competitive Indian sub-continent. The study is limited to the telecommunications industry and a deep dive in the health sector would provide new marketing innovations to curb the inefficiencies in contact tracing, quarantine management and home follow-ups for COVID-19 patients.

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9. Competing interests

The authors declare that they have no competing interests.

References

Adede, O. A., Kibera, F. N., & Owino, J. O. (2017). Electronic marketing practices, competitive environment and performance of telecommunications companies in Kenya. *British Journal of Marketing Studies*, 5(5), 60-67.

Aghion, P., Bergeaud, A., Boppart, T., Klenow, P. J., & Li, H. (2019). Missing growth from creative destruction. *American Economic Review*, *109*(8), 77-91. doi:10.1257/aer.20171745.

Anning-Dorson, T. (2018). Innovation and competitive advantage creation. *International Marketing Review, 35*(4), 580–600. doi:10.1108/imr-11-2015-0262.

Anning-Dorson, T., Hinson, R. E., & Amidu, M. (2018). Managing market innovation for competitive advantage: how external dynamics hold sway for financial services. *International Journal of Financial Services Management*,9(1), 70-87. doi:10.1504/IJFSM.2018.10011051.

Asimakopoulos, G., & Whalley, J. (2017). Market leadership, technological progress and relative performance in the mobile telecommunications industry. *Technological Forecasting and Social Change*, *123*, 57-67. doi:10.1016/j.techfore.2017.06.021.

Bansal, G., Anand, A., & Yadavalli, V. S. S. (2019). Predicting effective customer lifetime: an application of survival analysis for telecommunication industry. *Communications in Statistics - Theory and Methods,* 49(10), 2305–2320. doi:10.1080/03610926.2019.1570264.

Bayraktar, C. A., Hancerliogullari, G., Cetinguc, B., & Calisir, F. (2017). Competitive strategies, innovation, and firm performance: an empirical study in a developing economy environment. *Technology Analysis & Strategic Management*, 29(1), 38-52. doi:10.1080/09537325.2016.1194973.

Ben Hassine, H. (2019). Productivity growth and resource reallocation in France: The process of creative destruction. *Economie et Statistique*, *507*(1), 115-133. doi:10.24187/ecostat.2019.507d.1979.

Berne, M., Vialle, P., & Whalley, J. (2019). An analysis of the disruptive impact of the entry of Free Mobile into the French mobile telecommunications market. *Telecommunications Policy*, *43*(3), 262-277. doi:10.1016/j.telpol.2018.07.007.

CA Report (2019). *Annual Telecommunications Report, 4th Quarter 2019*. Government Printers, Haile Selassie Avenue, Nairobi.

Cooper, D. R., & Schindler, P. S. (2014). *Business Research Methods* (12th ed.). New York: McGraw Hill.

Dougherty, M. R., Slevc, L. R., & Grand, J. A. (2019). Making research evaluation more transparent: Aligning research philosophy, institutional values, and reporting. *Perspectives on Psychological Science*, *14*(3), 361-375. doi:10.1177/1745691618810693.

KNBS (2020). *Annual statistical survey report of Kenya*. Government Printer, Haile Selassie Avenue, Nairobi.

Kothari, C. (2014) *Research methodology: Methods and techniques. (2nd ed)*. New Delhi: New Age International (P) Limited, Publishers.

Laban, O. M., & Deya, J. (2019). Strategic innovations and the performance of information communication technology firms in Nairobi Kenya. International Journal of Academic Research in Progressive *Education and Development*, *8*(2), 1-24. doi:10.6007/ijarped/v8-i2/5599.

Lin, X., Lu, T. J., & Chen, X. (2018). Technological innovation, market competition, and regulatory reform in telecommunications. *Wireless Personal Communications*, *102*(2), 997-1007. doi:10.1007/s11277-017-5128-9.

May, C., & Schedelik, M. (2019). Comparative capitalism and innovation policy: complementarities and comparative institutional advantage. *Journal of Economic Policy Reform*, 1-16. doi:10.1080/17487870.2019.1637589.

Medrano, N., & Olarte-Pascual, C. (2016). The effects of the crisis on marketing innovation: An application for Spain. *Marketing Journal of Business & Industrial Marketing, 31*(3), 404–417. doi:10.1108/JBIM-02-2013-0048.

Muthu, D., & Thangavelu, I. (2019). Driving sustained competitive advantage through agility, NDP and innovation for telecommunication service providers. *International Journal of Business Competition and Growth*, *6*(4), 244-272. doi:10.1504/IJBCG.2019.104072.

Nashiruddin, M. I. (2019). Creating competitive advantage in the turbulent business environment: Lesson learned from Indonesia telecommunication industry. *Buletin Pos dan Telekomunikasi*, *17*(1), 31-46.

Njeru, K. N., & Kariuki, P. (2019). Influence of Mckinsey framework on competitive advantage of firms in the telecommunications industry in Kenya. *Journal of International Business, Innovation and Strategic Management*, *3*(1), 68-81.

Osano, H. M., & Koine, P. W. (2016). Role of foreign direct investment on technology transfer and economic growth in Kenya: a case of the energy sector. Journal of Innovation and Entrepreneurship, 5(1), 1-25. doi:10.1186/s13731-016-0059-3.

Porter, M. E., & Kramer, M. R. (2019). Creating shared value. In *Managing sustainable business* (323-346). Springer, Dordrecht. doi:10.1007/978-94-024-1144-7_16.

Quaye, D., & Mensah, I. (2019). Marketing innovation and sustainable competitive advantage of manufacturing SMEs in Ghana. *Management Decision,* 57(7), 1535–1553. doi:10.1108/md-08-2017-0784.

Rejoice, O. E., Stephen, O. U., & Oby, O. B. (2019). Relationship between corporate image and competitive advantage in mobile telecommunication industry in Nigeria. *European Journal of Innovative Business Management*, *3*, 1-9. Retrieved 20 July 2020 from: http://whitesscience.com/wp-content/uploads/woocommerce_uploads/2019/07/EJIBM_2019_1-9.pdf.

Safaricom Report (2019). *Annual Sectoral Report on Human Resources and Development of the Company*. Retrieved on 20 July 2020 from: https://www.safaricom.co.ke/images/Downloads/Safaricom_Annual_Report_2019.pdf.

Sitanggang, C. H., & Absah, Y. (2019). The influence of innovation, cost leadership strategy and customer orientation on competitive advantage and its impact on customer satisfaction at container depot of Pt Masaji Tatanan Container Branch of Belawan. *International Journal of Research and Review*, *6*(1), 34-46.

Sun, S. L., & Lee, R. P. (2013). Enhancing Innovation through International Joint Venture Portfolios: From the Emerging Firm Perspective. *Journal of International Marketing, 21*(3), 1–21. doi:10.1509/jim.13.0016.

Sutapa, S., Mulyana, M., & Wasitowati, W. (2017). The Role of Market Orientation, Creativity and Innovation in Creating Competitive Advantages and Creative Industry Performance. *Jurnal Dinamika Manajemen, 8*(2), 152-166. doi:10.15294/jdm.v1i1.12756.

Trubnikov, D. (2019). The Russian Telecommunications Experience: a Positive Outcome of the Competitive Order in the Industry. *Journal of Industry, Competition and Trade, 20*(1), 35–58. doi:10.1007/s10842-019-00304-5.

Wonyra, K. O. (2018). Impact of Telecommunications Market Liberalization on Labor Productivity in Economic Community of West African States. *Journal of Social Economics Research, 5*(2), 63–74. doi:10.18488/journal.35.2018.52.63.74.

Yeboah-Asiamah, E., Quaye, D. M., & Nimako, S. G. (2016). The effects of lucky draw sales promotion on brand loyalty in mobile telecommunication industry. *African Journal of Economic and Management Studies, 7*(1), 109–123. doi:10.1108/ajems-09-2013-0076.

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Examining linkage for national economic policy development

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Purpose. To study critically examines links as a criterion in shaping Indonesia's economic policy and to evaluate the relationship between sectors' forward linkages and sectors' contribution to net export earnings, employment generation, and value-added creation of Indonesia's manufacturing.

Design/Method/Approach. Statistical analysis of the industries sectors' forward linkages and sectors' contribution to net export earnings, employment generation, and value-added creation of Indonesia's manufacturing between 1995 and 2005.

Findings. The policies based on intersectoral input linkages have been prevalent and implemented in many developing countries. Indonesia's Government has frequently introduced the policies based on linkages. It is established that a sector with high linkages does not always provide a greater contribution to the economy. During the research window, sectors with lower forward linkages significantly contributed to Indonesian net export earnings, job creation, and value-added. However, this study does not mean that high connections are bad. This study argues that policymakers should also take into account factors other than relationships.

Practical implications. The results of analysis links of Indonesia`s performance in the industries from 1995 to 2000 suggest that the policies based on interconnections, such as policies to provide greater domestic added value, are unwarranted, and but there is no need to place too much emphasis by forward linkages in policymaking.

Originality/Value. This study emphasizes that all factors that are direct in the formulation of economic policy should be considered as comparative advantages.

Paper type. Empirical.

Keywords: intersectoral links; Indonesia's government; policy making; export earning.

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Вивчення зв'язків для розробки національної економічної політики

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Мета роботи. Критично вивчити зв'язки як критерію формування економічної політики Індонезії.

Дизайн/Метод/План дослідження. Статистичний аналіз прямих зв'язків галузей промисловості та внеску секторів у чистий експортний дохід, створення зайнятості та створення доданої вартості виробництва Індонезії у період між 1995 та 2005 роками.

Результати дослідження. Політика, заснована на міжгалузевих зв'язках, була поширеною і застосовувалась у багатьох країнах, що розвиваються. Уряд Індонезії часто запроваджував політику, засновану на зв'язках. Встановлено, що сектор з високими зв'язками не завжди забезпечує більший внесок в економіку. У періоді дослідження сектори з нижчими прямими зв'язками суттєво сприяли чистим прибуткам від експорту Індонезії, створенню робочих місць та доданій вартості. Однак це дослідження не означає, що високі зв'язки погані. У цьому дослідженні стверджується, що політикам також треба враховувати інші фактори, крім відносин.

Практичне значення дослідження. Результати аналізу зв'язків діяльності Індонезії в галузях промисловості з 1995 по 2000 рр. свідчать, що політика, що базується на взаємозв'язках, така як політика забезпечення більшої внутрішньої доданої вартості, необгрунтована, та немає необхідності занадто акцентувати увагу до прямих зв'язків під час формування політики.

Оригінальність/Цінність/Наукова новизна дослідження. У цьому дослідженні підкреслюється, що всі фактори, які є безпосередніми при формуванні економічної політики, слід розглядати як порівняльні переваги.

Обмеження дослідження/Перспективи подальших досліджень. У наступних статтях доцільно критично вивчити основні макроекономічні показники, що дозволить оцінити актуальність і високу здійсненність зміни або трансформації економічної політики Індонезії.

Тип статті. Емпіричний.

Ключові слова: міжгалузеві зв'язки; Уряд Індонезії; вироблення політики; експортний дохід.

Изучение связей для разработки национальной экономической политики

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Цель работы. Критически изучить связи как критерий при формировании экономической политики Индонезии.

Дизайн/Метод/План исследования. Статистический анализ прямых связей между отраслями промышленности и их вклада в чистую экспортную выручку, создание рабочих мест и создание добавленной стоимости в обрабатывающей промышленности Индонезии в период с 1995 по 2005 год.

Результаты исследования. Политика, основанная на межсекторальных связях ресурсов, широко распространена и реализована во многих развивающихся странах. Правительство Индонезии часто вводило политику, основанную на связях. Установлено, что сектор с высокими связями не всегда вносит больший вклад в экономику. В течение периода исследования секторы с более низкими прямыми связями внесли значительный вклад в чистую экспортную выручку Индонезии, создание рабочих мест и добавленную стоимость. Однако это исследование не означает, что высокие связи – это плохо. В этом исследовании утверждается, что директивным органам также следует принимать во внимание и другие факторы, помимо взаимоотношений.

Практическое значение исследования. Результаты анализа связей показателей Индонезии в отраслях с 1995 по 2000 гг. показывают, что политика, основанная на взаимосвязях, такая как политика по обеспечению большей внутренней добавленной стоимости, не оправдана, и нет необходимости значительно акцентировать внимание на прямые связи в разработке политики.

Оригинальность/Ценность/Научная новизна исследования. В данном исследовании подчеркивается, что все факторы, непосредственно влияющие на формулирование экономической политики, следует рассматривать как сравнительные преимущества.

Ограничения исследования/Перспективы дальнейших исследований. В следующих статьях целесообразно критически изучить основные макроэкономические показатели, что позволит оценить актуальность и высокую осуществимость изменения или трансформации экономической политики Индонезии.

Тип статьи. Эмпирический.

Ключевые слова: межотраслевые связи; Правительство Индонезии; создание политики; экспортный доход.

1. Introduction

Intersectoral input linkages ('linkages' for short) have been very popular among developing countries as a policymaking tool. As a result, the policies based on domestic backward and forward linkages are rapidly being implemented in these countries. Linkages-based policies go by many names, such as import-substituting industries, increasing value-added, beneficiation, and promoting "downstream" industries *(Hausmann, Klinger, & Lawrence, 2008)*. ISI is a policy based on domestic backward linkages, while others are based on domestic forward linkages.

In Indonesia, the policies based on backward linkages have also been popular. For example, Indonesia pursued import-substituting industrialization (ISI) during 1970-1985. During this period, state-owned enterprises played an important role by establishing new plants or expanding existing factories' capacity in the iron basic/steel, oil refining, and non-ferrous metal sectors. On the other hand, the private sector drove the ISI in the yarn spun and transport equipment sectors (*Ishida, 2003*). In the next decade, Indonesia implements beneficiation (based on forward linkages). This regulation states that all minerals that are being extracted from Indonesian soil need to be processed further before being exported. The policy aims to ensure that the exploitation of mineral resources from Indonesian soil provides a higher contribution than before. Implementing this regulation is expected to benefit the Indonesian economy, mainly by giving the domestic economy cheaper input. Hence, domestic industries are expected to grow faster (*Dudley, 2004; Kim, 2010; Price & Nance, 2010*).

The idea of the policies above is in line with the strategy offered by Hirschman (*Hirschman, 1958*). He initially points out that focusing the economic development on a highly forward linked sector, such as the iron and steel manufacturing sector, will have a larger effect on the economy by increasing domestic value-added and stimulating a downstream industry. However, the forward linkages-based policy, especially in the form of export restriction of unprocessed strategic material, is still questionable. Even though some scholars above find that this policy is beneficial, others conclude that it harms the economy (*Kishor, Mani, & Constantino, 2004; Gellert, 2005; Resosudarmo & Yusuf, 2006*). Generally, they have found that the policy causes a decline in net export earnings and employment generation. Moreover, some scholars also argue that traditional comparative advantage factors play more roles in determining patterns of growth rather than linkages. Therefore, they conclude that this kind of policy is fundamentally flawed (*Riedel, 1975; Athukorala & Santosa, 1997; Hausmann et al., 2008*).

Despite these concerns, in Indonesia, the policies based on linkages are rarely questioned by the researcher. Perhaps because of the consensus among decision-makers and researchers about linkages' appropriateness as a tool for policymaking *(Athukorala & Santosa, 1997)*. Therefore, the policy based on the linkages has always been embodied in Indonesia's five-year development planning (*Repelita*), from *Repelita* IV (1984/85-1988/89) until the latest *Repelita* (2009-2014) (*Kementerian Perindustrian, 2012*).

This research aims to provide another piece of evidence about the use of linkages as a tool for policymaking. Unlike the previous study by *Athukorala & Santosa (1997)*, this essay examines the relationship between the sector's forward linkages and the sector's contribution to net export earnings, employment generation, and value-added creation. This essay applies input-output analysis to examine the relationship by utilizing three of Indonesia's IO (Input-Output) tables between 1995 and 2005. The researcher chooses the project of investment and financial support beginning from 1995, 2000 and 2005. Since the IO table consists of 66 industrial sectors, it is sufficient for this research as this research focuses only on examining the average historical trend of forward linkages and comparing sectoral performance.

2. Theoretical background

The concept of linkages was grounded by *the unbalanced growth theory* proposed by *Hirschman* (*1958*) and *Singer* (*1958*). They argue that unbalanced growth should be deliberately created to foster an economic growth in developing countries. They believe that this idea is suitable for developing countries since most developing countries are limited in terms of resources and capital. Furthermore, due to limited resources and money, developing countries can only afford to finance one major project or one primary industry. They believe that one primary industry, which will create imbalances, can increase demand from other domestic industries and increase supply to other domestic industries.

In line with Hirschman, other proponents of the unbalanced growth theory also argue that imbalances will stimulate the pressure required to induce investment *(Meier, 1976; Weber & Shaikh, 2020)*. To demonstrate the unbalanced growth theory's potential, especially in determining the most effective industries as a leading power to push other industries, *Hirschman* (*1958*) uses the concept of Linkages. He explains that the way an industry affects other sectors can be measured from its backward and forward linkages.

Using the concept of linkages above, *Hirschman* (*1958*) proposes an idea which implies that the industry with the highest linkages should be selected to create the imbalances. He reveals that the imbalances will create a "big push" to other industries. A study conducted by Hirschman himself finds that iron and steel manufacture had the highest total linkages; meanwhile agriculture had the weakest total linkages. Determining the highest linked industry can only be conducted by empirical studies using an input-output model. One reason is because the industry with the highest linkages may vary for each country and for each time (*Ezeala-Harrison, 1996*).

The idea of using linkages as a tool to pick the highest linked industry has been very popular among developing countries as a ground to formulate a policy *(Ngan et al., 2019; Hauge, 2020; Kwatra et al., 2020)*. One well-known policy, based on choosing a manufacturing sector with the highest backward linkages, is import-substitution industrialization (ISI). Most of the ISI is implemented by encouraging domestic industries to produce finished goods that were previously imported. Recently, the policy based on backward linkages such as ISI has been widely abandoned by most developing countries. The main reason is because the policy, which is usually combined with several central governments planning, is viewed as a policy that leads to stagnation and macroeconomic crises (*Bruton, 1998*).

In contrast with backward linkages-based policies, the policies based on forward linkages are still popular among developing countries (*van Neuss, 2019*). The forward linkages-based policies are established under various types and names, such as increasing domestic value added, promoting downstream industries, or beneficiation *(Hausmann et al., 2008)*. These kinds of policies mainly aim to encourage and promote domestic industries to process the raw material that has been exported before. The policy is based on the idea that shifting the industry from a raw material exporter into a high value-added goods exporter can increase net export earnings and generate more employment. The increase in output for the selected sector will also provide additional supply for other domestic industries, increasing the output for overall industries. These policies are mostly implemented by restricting export for unprocessed raw material and allocating this raw material as input for domestic manufacturing industries.

The policy based on forward linkages, especially export restriction, can be found in many developing countries. The Solomon Islands has imposed export taxes on unprocessed timber and fish, while Ghana and Gabon maintain log export restrictions to promote downstream processing. In the mining

sector, Zambia is trying to increase their domestic value added in the manufacturing sector of copper and other metals by restricting the export of related raw materials (*Terheggen, 2011*). Also, Botswana is trying to limit the export of diamonds so that raw diamonds can be processed further within domestic industries. However, recently Botswana has removed this barrier (*Korinek, 2014*). In developed countries, one example is provided by Australia where the Australian government intends to increase the value-added of their uranium by encouraging downstream processing. Empirical studies that evaluate the linkage-based policy produce mixed results. Those who conclude that this policy benefits find that the policy may benefit the economy in two ways. First, this policy will lower prices of raw materials and provide a comparative advantage for domestic industries. These domestic industries can receive more profit, and more growth can be contributed to the economy. Secondly, the growth of domestic industries will need more employees to run their business. Therefore, more work opportunities are available in the economy *(Dudley, 2004; Kim, 2010; Price & Nance, 2010*). However, other scholars find opposite results. They conclude that an increase in value-added, net export earnings, and employment generation are not efficiently achieved. Some find that these kinds of policies may lead to a shrinkage in production since low domestic price provides less incentives for existing companies to produce and invest (*Kim, 2010; Korinek & Kim, 2011*). Another researcher expresses concern since it might take some years before domestic industries become internationally competitive (Goodland & Daly 1996 cited in *(Fooks, Dundas & Awokuse, 2013*)). Also, there is an indication that the policy may exacerbate the unemployment problem in developing countries (*Dean & Gangopadhyay, 1997; Gilbert & Wahl, 2001; Kishor et al., 2004*). Past studies regarding the linkage-based policy in Indonesia have generally found that export restriction on logs, applied in the 1980s, induced the growth in plywood and sawn wood industries, and generated higher profit from the forestry sector during 1979-1989 (*Lindsay, 1989; Togu Manurung & Buongiorno, 1997; Gellert, 2005*). Nevertheless, these studies have also found that timber export restriction caused negative net exports from plywood and sand wood. In addition, other research found that even though it might provide more job opportunities in the long term, the generation of employment will plummet in the short term. Therefore, it was considered as not being beneficial (Aziz 1992 in (*Lo & Akrasanee, 1992; Resosudarmo & Yusuf, 2006*)).

While the economic impact of the policy is unclear, the policies are argued to be fundamentally flawed. *Athukorala and Santosa* (*1997*) argue that emphasizing linkages for policymaking is fundamentally flawed because it does not suit the traditional factor proportion considerations and ignores a comparative advantage. *Riedel* (*1975*) also argues that the existence of high linkages as a single criterion is not sufficient to ensure that induced mechanisms will be created. Furthermore, *Hausmann et al.* (*2008*) argue that linkages-based policies, rather than using a systematic analysis, are based only on logic, anecdotes, and self-evident truth. They explain that the policy is based only on a belief that it is a natural and logic way to obtain more profit.

3. Problem statement

The purpose of this research is to study critically examines links as a criterion in shaping Indonesia's economic policy and to evaluate the relationship between sectors' forward linkages and sectors' contribution to net export earnings, employment generation, and value-added creation of Indonesia's manufacturing.

4. Methodology and Data

The methodological basis of the study is the basic tools, strategic goals of interdisciplinary relations between countries. Feedback-based policies are popular for Indonesia. The used method is an analysis, synthesis, process modelling, and statistical generalization. The only way to compute the linkages and decide which sector of industries has the highest linkages is by conducting an input-output analysis (*Ezeala-Harrison, 1996*). This research conducts an input-output analysis using the Indonesian IO table. There are two reasons why using the Indonesian IO table is relevant. First, the Indonesia IO table separates the number of imports in the intermediate input matrix. This is useful in computing the total net export earnings. Second, Indonesia has frequently implemented the policy based on linkages. Therefore, it is essential to see whether this kind of policy is warranted or not. In this research, three Indonesian IO tables (1995, 2000, 2005) are used. Each IO table classifies the Indonesian industries into 66 industrial sectors. The IO table, which consists of 66 industrial sectors, is sufficient for this research since this research focuses only on examining the average historical trend of forward linkages and comparing sectoral performance. In the future, this research can be improved using a more disaggregated table. The methodology used in this research involves examining the relationship between sectors' forward linkages and sectors' performance in the Indonesian manufacturing industries. This essay focuses more on the manufacturing sector for two reasons. First, the manufacturing sector is viewed to have higher forward linkages, and Hirschman himself found that iron and steel manufacturing had the highest linkages among all. Second, it is more suitable to compare the iron and steel manufacturing sectors' performance with other manufacturing sectors rather than compare it with the non-manufacturing sector. Sector performances are measured by their contribution to net export earnings, employment creation, and value-added generation. These three criteria are variables that are targeted by the increasing domestic value-added policy in Indonesia.

4.1. Measuring Forward Linkages

The most common method in measuring the forward linkages is using Leontief model. In the IO table, the gross output vector (x) is equal to the sum of intermediate input matrix (Z) and final demand matrix (F).

$$x = Z + F \quad (1).$$

The intermediate input matrix represents part of the output that is used as input in the domestic industries. Therefore, the intermediate input matrix can be represented in another way: the technology coefficient matrix (A) times the gross output vector.

$$Z = Ax \quad (2),$$

where the element of A is generated by dividing each intermediate input cell by the total output from its associated column, $(a_{ij}) = z_{ij}/x_j$

Leontief's inverse matrix (L) is then can be generated by:

$$L = (I - A)^{-1} \quad (3).$$

The total forward linkages, direct and indirect forward linkages, for each sector is the sum of the row of Leontief's inverse matrix.

$$FL_j = \sum_j^n l_{ij} \quad (4).$$

However, the validity of using Leontief's inverse matrix to calculate forward linkages is questioned by many scholars. The main reason is that Leontief model interprets forward linkages as a measure of the impact of simultaneous unit changes in each and every sector of the final demands. This interpretation was viewed sceptically by *Jones* (*1976*) because of the 'simultaneous unit changes' assumption's insensibility. *Beyers* (*1976*) also objected to this interpretation since he disagreed with the measurement of forward linkages based on the strength of backward linkages *(Cai*

& *Leung, 2004*). The common alternative in measuring forward linkages is using the Ghosh model. The difference with the Leontief model is that while the Leontief inverse matrix explains the relationship between the sectoral gross outputs to the amount of final demand, the Ghosh price model instead suggests the connectivity between the sectoral gross outputs to the primary inputs. Mathematically, the computation using the Ghosh model is made possible by transposing the vertical column view into a horizontal one. Therefore, in generating the inverse matrix, rather than dividing each cell by the output of a sector associated with that column, the Ghosh model divides each cell by the total output associated with its row. *Miller & Blair* (*2009*) uses matrix *B* to represent the intermediate input matrix (the Gosh model), so that it can be differentiated with the Leontief model term. Matrix *B*, can be defined as:

$$B = \hat{x}^{-1}Z \quad (5).$$

This step is the only difference between Ghosh and Leontief models. Using the same method with the Leontief model, the Ghosh inverse matrix (G) or the output inverse matrix can be calculated by:

$$G = (I - B)^{-1} \quad (6),$$

thus, the total forward linkages can be calculated as

$$FL_j = \sum_j^n g_{ij} \quad (7).$$

The element of G (g_{ij}) can be interpreted as "the total value of production that comes about in sector *j* per unit input of sector *i*" (Augustinovics (1970) cited in *Miller & Blair* (*2009*)). Many scholars are still discussing the debate surrounding the measurement of the forward linkages, and no decisive consensus is achieved. Most of the discussion is to find how to formulate the single measurement of forward linkages. This essay uses an approach taken by *Hausmann et al. (2008*), which utilizes both models and uses both results for the analysis procedure.

4.2. Measuring Sectoral Performance

In measuring the contribution of each sector, this study uses the extension of the Leontief model developed by Athukorala and Santosa (*Athukorala & Santosa, 1997*). In measuring the net export earnings, matrix *R* is utilized. Matrix *R*, where

$$r_i = R_i/X_i \quad (8),$$

describes the direct import which is required in a particular sector. Matrix *R* can then be used to create an import inverse matrix (*M*).

$$M = R(I - A)^{-1} \quad (9).$$

The elements of *M*, (m_{ij}) indicate the total import of *i* required by domestic industries to produce one unit of *j*. The total additional import of all sectors when there is an output increase in *j*, represented by m_{Tj}, can be estimated as:

$$m_{Tj} = \sum_i^n m_{ij} \quad (10).$$

Net export earnings from sector *j*, (e_j^{net}) can then be calculated by:

$$e_j^{net} = e_j - m_{Tj}e_j = (1 - m_{Tj})e_j \quad (11),$$

where $e_j$is export from sector *j* and $m_{Tj}e_j$indicates the total value of imports embodied in e_j.

To measure the sectoral contribution to generating value added, a diagonal matrix of value-added coefficient, $V=[v_i]$, $v_i = V_i/X_i$, is utilized. The elements of this matrix show value-added per unit gross output in each sector. Since this research is also interested in measuring additional value added by increasing output of one industry, this research also computes the value-added multiplier. The value-added multiplier can be calculated by:

$$m_{va} = \sum_i^n va_{ij} \quad (12),$$

where va_{ij} is an element of matrix *VA*. This matrix can be shown by (13):

$$va_{ij} = V(I - A)^{-1} \quad (13)$$

Using the extension of the Leontief inverse matrix, total value-added induced by exports can be shown by:

$$VA = V(I - A)^{-1}E \quad (14),$$

where *E* is the matrix of export per sector.

Similar steps are used to measure sectors' employment contribution. A new diagonal matrix *G* is introduced, in which the elements describe the number of workers employed per sector. Therefore, the employment multiplier is:

$$m_l = \sum_i^n g_{ij} \quad (15).$$

And the export-induced employment matrix, *L*, is shown by:

$$L = G(I - A)^{-1}E \quad (16).$$

The method above is also used to compute the sectoral performance using the Ghosh model. The difference is only by replacing the Leontief inverse matrix with the Ghosh inverse matrix. Thus, while generating the import inverse matrix, the computation will be:

$$M = R(I - B)^{-1} \quad (17).$$

5. Results

It is important to notice that this research uses two methods in measuring forward linkages. This study finds that these two methods do not generate contrasting results based on both models' calculations. To simplify, only the results from the Ghosh model are displayed. *Tab.1* shows the fluctuation of the sectors' forward linkages and sectors' contribution of the whole manufacturing industries during the research window. An increase followed a decline in the average of forward linkages in 1995, 2000 and 2005. In contrast with the average value of forward linkages, different patterns were shown by sectors' performances. For instance, net export earnings' value increased slightly from 1995 to 2000, then there was a sharp rise in 2005, reaching approximately $56 million. It is also vital to notice that the manufacturing sectors' contribution declined from 2000 to 2005. This trend implies that even though net export earnings from the manufacturing sectors were rising, the export from other industries such as agriculture and mining were also increasing with higher proportions. In terms of employment generation and value-added creation, the trend is also moving in the opposite direction with forward linkages. As the value of forward linkages increases, the amount of sectoral contribution tends to decreases. This pattern shows that, in general, the value of forward linkages does not clearly represent the sectoral contribution. The same results are also found using the Leontief model. The magnitude of forward linkages may not be the same, but the value of average forward linkages and sectoral performances move in the opposite direction. *Tab.2* displays the coal and metal ore mining sector.

Table 1: Manufacturing Sectors (Overall)*

Indicator	1995	2000	2005
Forward Linkage (average)	1.66	1.55	1.70
Gross exports ($ million)	35,056.68	38,054.47	56,706.23
Net exports ($ million)	26,478.31	26,772.58	40,856.28
Contribution to total net export earnings (%)	52.35	62.75	53.21
Employment multiplier (for $1,000 worth of export)	0.54	1.44	0.80
Export-induced employment ('000)	3,775.10	6,851.40	5,918.59
Export-induced employment (% of total)	2.73	2.20	1.29
VA multiplier (for $1,000 worth of export)	10.37	9.84	10.22
Export-induced VA ($ million)	20,830.83	20,948.64	33,781.36
Export-induced VA (% of total)	7,78	15.33	11.74

*__Source:__ completed by the authors.

Table 2: Coal and Metal Ore Sector*

Indicator	1995	2000	2005
Forward Linkage	1.53	1.80	1.62
Import intensity (average)	0.02	0.05	0.07
Gross exports ($ million)	3,288.99	2,629.80	8,462.56
Net exports ($ million)	3,210.64	2,491.07	7,897.80
Contribution to total net export earnings (%)	6.35	5.84	10.29
Employment multiplier (for $1,000 worth of export)	0.05	0.09	0.05
Export-induced employment ('000)	121.65	138.75	146.27
Value added ($ million)	3,898.55	3,823.89	10,231.93
VA multiplier (for $1,000 worth of export)	1.79	9.22	9.32
Export-induced VA ($ million)	3,100.75	2,818.10	7,702.57
Export-induced VA (% of total)	4.14	4.42	6.95

*__Source:__ completed by the authors.

During the research window, this sector contributed a significant amount of net export earnings. Assuming that the current industry structure is not significantly different, restricting exports from this sector reduced a considerable amount of net export revenue for Indonesia's economy by around 6% in 1995 and 2000, and then reached approximately 10% of total net export earnings in 2005. In addition to this loss, employment from the mining sector was also reduced.

The export-induced employment during the period of the study reached approximately 146,000 workers. These workers will be unemployed if the export restriction policy (based on forward linkage) is implemented. This result is in line with the study by *Azis (1992)*, which found that the employment opportunities will be decreased in the short run after the export restriction is imposed.

Compared to the coal and metal ore mining sector, iron and basic steel manufacturers' contribution during the period under study was below the mining sector contribution (*Tab.3*). Although the iron and basic steel manufacturing sectors' forward linkages are higher than the coal and metal ore mining sectors, the iron and basic steel manufacturing sectors contribute relatively small net export earnings, employment, and value-added. However, it is essential to notice that this sector has a higher employment multiplier. Therefore, the growth of this sector might provide more job opportunities in the long run.

Table 3: Iron and Basic Steel Sector*

Indicator	1995	2000	2005
Forward Linkage	2.17	2.23	2.18
Import intensity (average)	0.19	0.27	0.31
Gross exports ($ million)	325.25	295.74	530.98
Net exports ($ million)	262.08	217.18	365.84
Contribution to total net export earnings (%)	0.52	0.51	0.48
Employment multiplier (for $1,000 worth of export)	0.30	0.77	0.10
Export-induced employment ('000)	6.69	31.26	27.64
Value added ($ million)	2,148.54	539.61	815.29
VA multiplier (for $1,000 worth of export)	1.45	6.42	4.33
Export-induced VA ($ million)	340.73	332.34	493.39
Export-induced VA (% of total)	0.45	0.52	0.45

*__Source:__ completed by the authors.

This essay analyses the sectoral comparison between the iron and basic steel manufacturing sector and other manufacturing industries to make further analysis.

First, this study compares the iron and basic steel manufacturing sectors with the top net export earner during the study, the manufacture of textiles, wearing apparel, and leather (*Tab.4*). During the research window, the later sector had a smaller value of forward linkages than the former industry. Although it had smaller forward linkages, this sector performed outstandingly, marked with high net export earnings contribution, a high number of employees, and high value-added generation.

In all of the sectors' performance criteria, the contribution of the textiles, wearing apparel, and leather manufacturing sector outweighs the iron and basic steel manufacturer.

The result is almost the same if we compare the iron and basic steel manufacturing sector and the second top net export earner, the manufacture of bamboo and rattans products (*Tab.5*).

Table 4: Manufacture of Textiles, Wearing Apparel, And Leather*

Indicator	1995	2000	2005
Forward Linkage	1.31	1.22	1.33
Import intensity (average)	0.39	0.43	0.41
Gross exports ($ million)	7228.81	6410.21	7636.39
Net exports ($ million)	4405.39	3678.50	4481.13
Contribution to total net export earnings (%)	8.71	8.62	5.48
Employment multiplier (for $1,000 worth of export)	0.71	0.85	0.67
Export-induced employment ('000)	970.33	1535.46	1270.44
Value added ($ million)	5552.84	3486.02	6877.71
VA multiplier (for $1,000 worth of export)	3.23	12.87	13.93
Export-induced VA ($ million)	2951.88	2550.13	3617.19
Export-induced VA (% of total)	3.94	4.00	3.26

*__Source:__ completed by the authors.

Table 5: Manufacture of bamboo and rattan products*

Indicator	1995	2000	2005
Forward Linkage	1.51	1.33	1.54
Import intensity (average)	0.09	0.17	0.13
Gross exports ($ million)	5376.89	3716.23	4050.22
Net exports ($ million)	4915.28	3097.81	3533.74
Contribution to total net export earnings (%)	9.72	7.26	4.60
Employment multiplier (for $1,000 worth of export)	0.72	1.21	0.59
Export-induced employment ('000)	1121.94	1860.24	1423.20
Value added ($ million)	3934.86	2025.69	3546.25
VA multiplier (for $1,000 worth of export)	3.65	17.21	14.74
Export-induced VA ($ million)	2100.27	1537.98	2113.11
Export-induced VA (% of total)	2.80	2.41	1.91

*__Source:__ completed by the authors.

The forward linkages of bamboo and rattan manufacturing sectors were again smaller than the iron and basic steel manufacturing sectors had. Nonetheless, although the contribution was smaller than in the textile manufacturing sector, the contribution of bamboo and rattan manufacturing sectors outweighs the iron and basic steel manufacturing sector's contribution. These results show that higher linkages may not be associated with a high contribution to the economy.

The other information that can be concluded is that these sectors are labour-intensive industries. Even though most of their workers are low skilled workers, these sectors are primary sectors that can absorb numerous employments.

Furthermore, this type of industries is consistent with Indonesia's characteristics as a labour abundant country. On the other hand, the iron and basic steel manufacturing industry needs high capital (capital intensive industries). This kind of industry might not yet be suitable with Indonesia's comparative advantage.

Last, we compare the iron and basic steel manufacturing sector with the cigarettes manufacture (*Tab.6*). The iron and basic steel manufacturing sector had a higher net export contribution during the research window. However, in terms of employment generation, employment multiplier, and value-added multiplier, cigarette manufacturing was still slightly better.

Table 6: Manufacture of Cigarettes*

Indicator	1995	2000	2005
Forward Linkage	1.10	1.13	1.11
Import intensity (average)	0.12	0.21	0.13
Gross exports ($ million)	138.54	166.97	260.45
Net exports ($ million)	121.42	132.08	227.65
Contribution to total net export earnings (%)	0.24	0.31	0.30
Employment multiplier (for $1,000 worth of export)	1.96	5.37	3.53
Export-induced employment ('000)	30.32	33.02	17.10
Value added ($ million)	5209.47	2185.91	4478.38
VA multiplier (for $1,000 worth of export)	3.96	17.66	19.24
Export-induced VA ($ million)	135.27	184.29	271.29
Export-induced VA (% of total)	0.18	0.29	0.24

*__Source:__ completed by the authors.

6. Conclusion

The study critically examines links as a criterion in shaping Indonesia's economic policy. Based on the Indonesia's performance in the industries between 1995-2005, the results suggest that the policies based on interconnections, such as policies to provide greater domestic added value, are unwarranted. It is established that a sector with high linkages does not always provide a greater contribution to the economy. During the research window, sectors with lower forward linkages significantly contributed to Indonesian net export earnings, job creation, and value-added. However, this study does not mean that high connections are bad. This study argues that policymakers should also take into account factors other than relationships. This research, nonetheless, does not imply that high linkages are bad. This study simply argues that in formulating any policy, policymakers should also consider other factors besides linkages. The results suggest that other factors that should be considered in policy formulation are its comparative advantage. In Indonesia, its comparative advantage is a considerable number of workers. During the study period, labour-intensive industries contributed significant proportions of net export earnings and employment opportunities to Indonesia's economy. The results also show that implementing the linkages-based policy, such as

restricting the export of unprocessed raw material, can reduce Indonesia's revenue from net export earnings. Moreover, it can cause a decline in mining sector production. Therefore, some workers in these industries can be unemployed. Also, net export earnings and job creation from the manufacture of iron and basic steel industries are not ready to offset the mining sector's loss in the short term. The article would greatly benefit from providing basic macroeconomic indicators for Indonesia, which would allow to assess the relevance and high feasibility of changing or transforming Indonesia's economic policy.

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8. Competing interests

The authors declare that they have no competing interests.

References

Athukorala, P., & Santosa, B. H. (1997). Gains from Indonesian Export Growth: Do Linkages Matter? *Bulletin of Indonesian Economic Studies, 33*(2), 73–95. doi:10.1080/00074919712331337135.

Beyers, W. B. (1976). Empirical Identification of Key Sectors: Some Further Evidence. *Environment and Planning A: Economy and Space, 8*(2), 231–236. doi:10.1068/a080231.

Bruton, H. J. (1998). A reconsideration of import substitution. *Journal of economic literature, 36*(2), 903-936. Available at: https://pseudoerasmus.files.wordpress.com/2017/01/bruton-1998-a-reconsideration-of-import-substitution.pdf.

Cai, J., & Leung, P. (2004). Linkage Measures: a Revisit and a Suggested Alternative. *Technology Analysis & Strategic Management, 16*(1), 63–83. doi:10.1080/0953531032000164800a.

Dean, J. M., & Gangopadhyay, S. (1997). Export Bans, Environmental Protection, and Unemployment. *Review of Development Economics, 1*(3), 324–336. doi:10.1111/1467-9361.00022.

Dudley, R. G. (2004). Modeling the effects of a log export ban in Indonesia. *System Dynamics Review*, *20*(2), 99–116. doi:10.1002/sdr.288.

Ezeala-Harrison, F. (1996). *Economic Development: Theory and Policy Applications*. Portsmouth: Greenwood Publishing Group.

Fooks, J. R., Dundas, S. J., & Awokuse, T. O. (2013). Are There Efficiency Gains from the Removal of Natural Resource Export Restrictions? Evidence from British Columbia. *The World Economy, 36*(8), 1098–1114. doi:10.1111/twec.12041.

Gellert, P. (2005). *Oligarchy in the Timber Markets of Indonesia: From Apkindo to IBRA to the Future of the Forests*. In the Politics and Economics of Indonesia's Natural Resources (pp. 145–161). doi:10.1355/9789812305497-015.

Gilbert, J., & Wahl, T. (2001). Export restrictions, urban unemployment, and the location of processing activities. *Economics Letters, 71*(1), 105–110. doi:10.1016/S0165-1765(00)00407-9.

Hauge, J. (2020). Industrial policy in the era of global value chains: Towards a developmentalist framework drawing on the industrialisation experiences of South Korea and Taiwan. *The World Economy*, *43*(8), 2070-2092. doi:10.1111/twec.12922.

Hausmann, R., Klinger, B., & Lawrence, R. (2008). Examining Beneficiation. CID Working Paper Series. Available at: https://growthlab.cid.harvard.edu/publications/examining-beneficiation.

Hirschman, A. (1958). The Strategy of Economic Development. New Haven: Yale University Press. doi:10.2307/1235188.

Ishida, M. (2003). Industrialization in Indonesia since the 1970s. Institute of Developing Economies, JETRO. Available at: https://core.ac.uk/download/pdf/288452028.pdf.

Jones, L. P. (1976). The Measurement of Hirschmanian Linkages. *The Quarterly Journal of Economics*, *90*(2), 323-333. doi:10.2307/1884635.

Kementerian Perindustrian. (2012). Analisis Biaya Manfaat Pelarangan Ekspor Bahan Mentah Minerba Dan Dampaknya Terhadap Sector Industri: Studi Kasus Nikel Dan Tembaga (A Cost Benefit Analysis On Exports Ban Of Raw Materials And Coal And Its Impact On The Industrial Sector : A Case Study Of. Jakarta: Biro Perncanaan Kementerian Perindustrian. Available at: http://rocana.kemenperin.go.id/phocadownload/Kajian/Buku%20Analisis%20Biaya-Manfaat%20Pelarangan%20Ekspor%20Bahan%20Mentah%20Minerba.pdf.

Kim, J. (2010). Recent Trends in Export Restrictions. OECD Trade Policy Papers, No. 101, OECD Publishing, Paris. doi:10.1787/5kmbjx63sl27-en.

Kishor, N., Mani, M., & Constantino, L. (2004). Economic and Environmental Benefits of Eliminating Log Export Bans – The Case of Costa Rica. *The World Economy*, *27*(4), 609–624. doi:10.1111/j.0378-5920.2004.00616.x.

Korinek, J. (2014). Export restrictions on raw materials: Experience with alternative policies in Botswana. *OECD Publishing*, (163). doi:10.1787/18166873.

Korinek, J., & Kim, J. (2011). Export restrictions on strategic raw materials and their impact on trade and global supply. *Journal of World Trade*, *45*(2), 255-281. Available at: https://kluwerlawonline.com/journalarticle/Journal+of+World+Trade/45.2/TRAD2011009.

Kwatra, S., Kumar, A., & Sharma, P. (2020). A critical review of studies related to construction and computation of Sustainable Development Indices. *Ecological Indicators*, *112*, 106061. doi:10.1016/j.ecolind.2019.106061.

Lindsay, H. (1989). The Indonesian Log Export Ban: An Estimation of Foregone Export Earnings. Bulletin of Indonesian Economic Studies, 25(2), 111–123. doi:10.1080/00074918812331335599.

Lo, F. C., & Akrasanee, N. (Eds.). (1992). The Future of Asia-Pacific Economies: Emerging Role of Asian NIEs and ASEAN: Papers and Proceedings of the Conference Held in November 1989 in Bangkok. Allied Publishers [for] Asian and Pacific Development Centre.

Meier, G. M. (1976). Leading Issues in Economic Development. Oxford: Oxford University Press.

Miller, R. E., & Blair, P. D. (2009). Input-output analysis: foundations and extensions. Cambridge university press. doi:10.1017/CBO9780511626982.

Ngan, S. L., How, B. S., Teng, S. Y., Promentilla, M. A. B., Yatim, P., Er, A. C., & Lam, H. L. (2019). Prioritization of sustainability indicators for promoting the circular economy: The case of developing countries. *Renewable and Sustainable Energy Reviews*, *111*, 314–331. doi:10.1016/j.rser.2019.05.001.

Resosudarmo, B. P., & Yusuf, A. A. (2006). Is the Log Export Ban an Efficient Instrument for Economic Development and Environmental Protection? The Case of Indonesia. *Asian Economic Papers*, 5(2), 75–104. doi:10.1162/asep.2006.5.2.75.

Riedel, J. (1975). Factor Proportions, Linkages and the Open Developing Economy. *The Review of Economics and Statistics*, 57(4), 487-494. https://doi.org/10.2307/1935909.

Singer, H. W. (1958). The Concept of Balanced Growth in Economic Development Theory and Practice. *Malayan Economic Review*, *3*(2), 1–13.

Terheggen, A. (2011). The Tropical Timber Industry in Gabon: A Forward Linkages Approachto Industrialisation. In MMCP Discussion Papers. Available at: https://www.researchgate.net/publication/223129805_The_Tropical_Timber_Industry_in_Gabon_A_Forward_Linkages_Approach_to_Industrialisation.

Togu Manurung, E. G., & Buongiorno, J. (1997). Effects of the ban on tropical log exports on the forestry sector of Indonesia. *Journal of World Forest Resource Management*, *8*(1), 21-49.

Trade, O., & Studies, P. (2010). The Economic Impact of Export Restrictions on Raw Materials. OECD Trade Policy Studies. doi:10.1787/9789264096448-en.

Van Neuss, L. (2019). The drivers of structural change. *Journal of Economic Surveys*, *33*(1), 309-349. doi:10.1111/joes.12266.

Weber, I., & Shaikh, A. (2020). The U.S.–China trade imbalance and the theory of free trade: debunking the currency manipulation argument. *International Review of Applied Economics*, 1–24. doi:10.1080/02692171.2020.1814221.

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