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Watching the Watchmen: Assessment-Biases in Waiting List Prioritization for the Delivery of Mental Health Services

F. Kreiseder‡, M. Mosenhauer‡‡

Purpose: While the demand for mental health services increases, supply often stagnates. Providing treatment to those most in need is an important factor in its efficient distribution. We propose and conduct a statistical procedure for detecting rater-biases in patient prioritization tools.

Design / Method / Approach: We gather real-life data from 266 illness severity assessments in an Austrian publicly funded mental health service provider, including a rich set of covariates. To ensure robustness, we merge this data with determinants of mental health and assessment identified by previous research, such as weather or seasonal indicators.

Findings: We find statistically significant effects of rater-biases. These effects are robust to a large array of controls.

Practical Implications: A back-of-the-envelope calculation reveals that the identified rater effects can translate to large changes in the waiting times for patients. Misspecified treatment allocations may lead to worsened symptoms and potentially fatal outcomes.

Originality / Value: Although a growing literature focuses on patient prioritization tools, many articles study these in synthetic contexts using “vignettes”. In comparison, our study adds external validity by considering real-life treatments in the field.

Research Limitations / Future Research: This study can be used as a starting point for deeper, causally focused studies.

Disclaimer: In accordance with publisher policies and our ethical obligations as researchers, we report that one of the authors is employed at a company that may be affected by the research reported in the enclosed paper. We have disclosed those interests fully.

Paper type: Empirical

Keywords: patient prioritization tools, illness severity assessment, rater-based effects, mental health.

Reference to this paper should be made as follows:
Спостереження за спостерігачем: викривлена оцінка при пріоритизації черги надання послуг стосовно психічного здоров'я

Фабіан Крейседер‡
Моріц Мозенгауер‡‡

Мета роботи: У той час як попит на послуги стосовно психічного здоров'я зростає, пропозиція часто стагнує. Надання лікування тим, хто найбільше потребує, є важливим фактором його ефективного розподілу. Ми пропонуємо та проводимо статистичну процедуру для виявлення викривлення оцінок у інструментах визначення пріоритетів пацієнтів.

Дизайн/Метод/Підхід дослідження: Ми зібрали реальні дані 266 оцінок тяжкості захворювання в австрійській державній установі психіатричної допомоги, включаючи багатий набір коваріацій. Для забезпечення надійності ми поєднали ці дані з детерміnantами психічного здоров'я та оцінки, визначені у попередніх дослідженнях, такими як погодні чи сезонні показники.

Результати дослідження: Ми виявили статистично значущий вплив оцінок-упереджень. Цей вплив є стійким до великої кількості контролів.

Практична цінність дослідження: Зворотний розрахунок показує, що виявлений вплив оцінок-упереджень може спричинити значні зміни у часі очікування пацієнтів. Неправильний розподіл черги на лікування може призвести до погіршення симптомів та потенційно смертельних наслідків.

Оригінальність/Цінність до слідження: Хоча все більше літератури присвячено інструментам визначення пріоритетів пацієнтів, багато статей вивчають їх у синтетичних контекстах, використовуючи «віньєтики». У порівнянні з цим наше дослідження додає зовнішню достовірність розглядаючи реальні методи лікування в польових умовах.

Обмеження дослідження/Майбутні дослідження: Дане дослідження може бути використане як відправна точка для більш глибоких, причинно орієнтованих досліджень.

Заява про відмову від відповідальності: Відповідно до політики видавництва та наших етичних забов'язань як дослідників, ми повідомляємо, що один з авторів працює в компанії, на яку може вплинути дослідження, представлене в цій статті. Ми розкрити ці інтереси.

Тип статті: Емпіричний

Ключові слова: інструменти визначення пріоритетів пацієнтів, оцінка тяжкості захворювання, вплив на оцінку, психічне здоров'я.
1. Introduction

Mental health services are confronted with an ever-widening mental health treatment gap. As a result, prolonged waiting times exacerbate symptoms (Clark et al., 2018; Reichert & Jacobs, 2018) and economic costs (Rechnungshof [BfH], 2019). Recently mental health services started to adopt need-based waiting list strategies. In the course of such, patients are assessed and prioritized based on the resulting assessment score. With real-world data, we investigate to what extent those priority scores are independent of their raters. Because ideally who scores the patient should not affect the priority score and subsequently not a patient’s access to mental health treatment.

Between 2005 and 2017 rates of major depressive episodes grew from 8.7% to 13.2% for adolescents between age 12 and 17; for young adults the rates from 2009 to 2017 inclined from 8.1% to 13.2% (Twenge et al., 2018). This may lead to a deteriorated performance in school, alcohol and drug consumption, bingeing, and suicidal ideation (Clied & Pine, 2002). The outbreak of the novel coronavirus has further deteriorated the mental health condition of many individuals (Brooks et al., 2020; Talevi et al., 2020). As a consequence, and despite the still prevailing stigma (Corrigan et al., 2014), mental health service utilization has increased (Lipson et al., 2019). However, while the demand has soared, the supply of mental health services stagnated, leaving many people untreated (Mojtabai et al., 2016).

Since privately financed treatment is for many not affordable (Berufsverband Österreichischer Psychologinnen [BÖP] & Karmasin Research & Identity, 2020), publicly funded treatment becomes often the only option available, but access to these services is connected with long waiting times (Luigi et al., 2013). Conversely, waiting time poses a major obstacle in accessing healthcare (McIntyre & Chow, 2020) and brings several other negative effects such as patient dissatisfaction (Lizaur-Utrilla et al., 2016; Nottingham et al., 2018), patient anxiety (Lizaur-Utrilla et al., 2016), and significantly poorer health outcomes (Clark et al., 2018; Reichert & Jacobs, 2018).

Therefore, the reduction of waiting time is a pressing issue for all stakeholders in mental health services. A possible solution to this problem might be the need-based allocation of scarce resources. The equivalent of this idea in healthcare might be found in patient prioritization tools. Such instruments assess and prioritize those patients with the highest level of need and allocate resources accordingly. But assessing patients on specific criteria is complex and sometimes subject to personal characteristics (Raymond et al., 2019). This further resonates with the common understanding in literature that clinical judgment is not without its flaws (Bell & Mellor, 2009) and often prone to produce biased results (Samuel & Bucher, 2017). These shortcomings are also reflected in the heterogeneous findings of earlier studies (Dery et al., 2020; Harding & Taylor, 2015) that investigated the tool’s reliability and validity. Regardless, determining a patient’s level of priority should not be influenced by the rater that conducts the scoring, especially not if a patient prioritization tool aims to provide a fair and transparent priority assessment (Harding & Taylor, 2015).

For our analysis, we obtained real-world data from the assessment center of an Austrian publicly funded mental health care provider. In this assessment center, incoming patients are scored by psychotherapists on several different dimensions, all of which aim to quantify a patient’s level of need for treatment. With this scoring data, we attempt to measure the potential effect that each rater has on the resulting priority score of a patient. In an ideal scenario, no such effects should be measurable. Because a biased assessment would lead to unjustifiably prolonged waiting times for some individuals and thus to unwanted discrimination. Furthermore, being stuck on the waiting list, instead of receiving appropriate treatment may deteriorate existing symptoms and, in the worst case, it might produce fatal outcomes.

An important contribution of our paper is valuable real-world insights into the quality of patient prioritization tools. This is critical, given the fact that earlier works were mostly built on vignettes, neglecting the differing conditions in real-world settings, including stress, time pressure, and risk (Price et al., 2006). Conditions that are, in fact, ubiquitous in mental health workers (Rössler, 2012). Furthermore, the concept of rater bias has been well addressed in other fields, such as in entrepreneurial settings (Thomas, 2017), in political beliefs (Hibbing et al., 2014), in forensic sciences (Kassin et al., 2013), and in grading (Muloff, 2008), to name a few. However, it has received notably less attention in patient priority assessments, and even more so for the ones employed in mental health settings. The findings of our study will hence add to the literature on rater bias. Ultimately, the results of this investigation are also highly relevant to practitioners as we highlight the concerns that are associated with the employment of such tools.

The structure of this article is as follows: section 2 will discuss the role of clinical judgment and biases as well as extraneous factors in patient priority assessments, leading to our hypothesis and the utilized control variables. Section 3 introduces the research question. Section 4 covers the methodology, research model and design of this study. Section 5 presents the study results. Section 6 contains a discussion of the results and their limitations. Finally, section 7 contains concluding remarks, which are followed by the bibliography.

2. Theoretical Background

This section sets out the theoretical foundation of this study, by giving an overview of how errors in clinical judgment occur. It also deals with the associated concept of rater biases and concludes then with a set of extraneous factors that facilitate such errors and biases.

2.1. Clinical Judgment and Bias

Any patient prioritization tools rely on scoring processes to determine a patient’s level of need. In general, scoring, as a form of measurement, requires the “assigning of numbers to observations (…) to quantify phenomena” (Kimberlin & Winterstein, 2008, p. 1376). These observations are usually made by clinicians or any other trained rating personnel and are succeeded by a judgment that quantifies the respective phenomenon with the help of rating scales. However, many of the phenomena in health care are theoretical constructs that cannot be measured precisely (Kimberlin & Winterstein, 2008), as clinicians find themselves in a position where they have to infer psychological characteristics, which are internal in nature, from the external behavior of a person (Reynolds & Suzuki, 2013). For example, how do you properly assess the suffering of a patient due to his or her condition? Having depression might be seriously debilitating for one person but a minor negative effect for another. The quantifying of abstract concepts thus creates room for uncertainty, which in turn provides fertile ground for judgment errors (Croskery, 2002).

And indeed, rater-based assessments are often found to be inaccurate, as raters tend to form categorical judgments about their examinées, but when these judgments are translated into ordinal or interval scales, conversion errors may arise (Gingerich et al., 2011). Bell & Mellor (2009), in their review on clinical judgments, also emphasized the lack of accuracy and reliability in many clinical judgments. In contrast, Christensen-Szalanski et al. (1982) advocated for the soundness of clinical judgment, provided that clinicians are experienced in their field. Whereas López (1989) found that the cognitive processes involved in clinical judgment are possibly influenced by irrelevant patient variables, which may consequently bias the judgment of clinicians, irrespective of the clinician’s experience. In line with Samuel & Bucher (2017) who concluded in their review that naturalistic clinical assessments are just as biased as any other human assessment source, which questions the perception of clinicians’ assessment abilities as the
gold standard for valid clinical judgment. Nevertheless, such biases lead to deviations from the objective truth and thus constitute a sometimes severe measurement error.

Judgment errors may also stem from systematic biases based on distortions in perceiving and/or processing information. They affect all kinds of human cognition and can thus not be attributed to one particular field nor the general cognitive ability of an individual (West et al., 2008), as they arise from both analytical and non-analytical thinking and can be the result of multiple causes (Norman & Eva, 2010). For example, their presence was observed in entrepreneurial settings (Thomas, 2018), in political beliefs (Hibbing et al., 2014), in forensic sciences (Kassin et al., 2013), and in grading (Malouff, 2008), to name a few. So, there is no reason to believe that priority assessments, conducted by therapists in mental health care settings, would be immune to such biases. Many scientific works have proven that bias is, in fact, also prevalent among clinicians (Bowes et al., 2010; Hairston et al., 2019; Wolfson et al., 2000). However, the extent of bias in patient priority assessments was not yet properly addressed in the literature. Still, given the multitude of findings in other settings that indicate the presence of bias in clinicians, it is assumed that bias is likely to play a role in patient priority assessments as well.

To summarize, the potential shortcomings of vignettes (Patel et al., 2002), the flaws in clinical judgment (Bell & Mellor, 2009), and the associated susceptibility to bias (Samuel & Bucher, 2017), as well as the mixed results on reliability and validity of patient prioritization tools that earlier studies generated (Déty et al., 2020; Harding & Taylor, 2019), emphasize the necessity of this study. Moreover, for a priority assessment to be fair and transparent, it must be independent of its rater. Our hypothesis, therefore, attempts to measure the independence of scoring results from their rater.

**Hypothesis**

H: The size of the initial score is associated with the therapist that conducted the scoring.

The following subsection will more deeply discuss the potential sources of biases that could influence a clinician’s rating.

### 2.2. Extraneous Factors

Any researchers have supported the notion that ratings are influenced by variables that should, in fact, be irrelevant in the decision-making process (Fitzgerald & Hurst, 2017; McDermott et al., 2014; Murrie et al., 2015; van Ryn & Burke, 2000), nevertheless, they regularly become apparent in the results. The following paragraphs will thus provide theoretical reasoning for the application of these variables as control variables in the analysis.

First, one of the most prominent biases is certainly discrimination towards gender or sex, as decades worth of research has shown. Often facilitated by explicit mechanisms such as stereotypes but also implicitly by an unconscious bias, such effects are widespread and were measured across many disciplines. For example, in hiring (Chan & Wang, 2018), in the workplace (Wynn & Correll, 2018), in science (Roper, 2019), in terms of disproportional media coverage (Shor et al., 2019), or access to healthcare (Ulasz, 2008). In other words, gender bias is omnipresent and creates vast social inequities.

Regardless, the gender or sex of a person should not play a role in assessing a patient or determining the priority of a referral. Yet, the literature indicates that underlying gender stereotypes may bias the assessment abilities of raters. Earp et al. (2019), for example, uncovered in their study that adults rated boys to experience more pain than girls, although both were under equal clinical circumstances and showed the same pain behavior. The authors also mentioned that when they controlled for explicit gender stereotypes the effects were eradicated. In a comparable analysis, Yourstone et al. (2008) found that when the perpetrator in a hypothetical criminal case was female, psychiatric clinicians and psychology students tended to rather declare the person as legally insane than compared to cases with male offenders.

Given the evidence on gender bias in clinical judgments, the sex of the patient will constitute a control variable in this analysis.

Several patient prioritization tools include age as a determining factor of priority (Hadorn & Steering Committee of the Western Canada Waiting List Project, 2000; MacCormick et al., 2003). However, other studies also indicate that unwanted age bias becomes apparent as well in priority decisions (Arslanian-Engoren, 2000; Arslanian-Engoren & Scott, 2016; Platts-Mills et al., 2010). If not explicitly specified as a criterion of priority, patient age should not play a role in patient prioritization tools. In the underlying data of our study, age is indeed a priority criterion but thus also accounted for in the score. Beyond that, age should not considerably influence the scoring. Hence, we also control for potential effects of age on the priority score.

The prevalence of mental disorders is also likely to underly seasonal variations. Such variations, for example, were found by Graef et al. (2005), even though they were minor and they focused their study on nations with a warm maritime climate, they discovered that overall the occurrence of mental disorders in winter is higher than in summer. On a comparable note, Slau white et al. (2019) investigated seasonal variations in psychiatric admissions to hospitals and found that for children and adolescents the highest rate of admissions was measured in February and for adults in May.

A different seasonal effect may become apparent due to Seasonal Affective Disorder (SAD). A fairly common condition (Magnusson, 2000) where affected individuals experience depression, along with other symptoms, in recurring seasonal intervals, mostly in winter (Magnusson & Boivin, 2003). Even though it can be treated quite successfully with light therapy, it affects approximately 1-3% of people living in moderate climate zones, with women being more likely to be affected by SAD than men (Magnusson & Boivin, 2005). Hence SAD appears to be fairly common in the population and its effects are thus likely to reveal seasonal differences in scoring results.

Furthermore, several studies reported on the deteriorated mental health due to the COVID-19 pandemic and lockdowns. A US study, conducted by Adams-Prussl et al. (2020), revealed that mental health was reduced by .085 standard deviations, an effect that is exclusively driven by women, leading to a widening of the gender gap in mental health. Similar declines in mental health were found also in the Italian population (Rossi et al., 2020). An Austrian Study (Pieh et al., 2020) reported a surge in depressive and anxiety symptoms. Apart from females, this effect seemed to be most stressful for young adults and socially disadvantaged groups like low-income and jobless individuals. During the pandemic, we encountered a number of both strict and less strict lockdowns, which often lasted several weeks. The effects of such restrictions, as discussed above, could lead to spikes in the prevalence and severity of mental disorders.

Given the frequency of SAD and the consequences of the pandemic on mental health, it is probable to see seasonal fluctuations influencing the scoring results. We attempt to control for this scenario, by using the months in which the scoring was conducted, as a measure to reveal seasonal differences.

On another note, many scientific articles have pointed to the strong influence of weather on our decision-making. In most cases this relationship is not a direct one, rather it is moderated by mood. This means that certain weather conditions influence our mood and the mood, in turn, affects our decision-making.

In general, people in good moods tend to be more optimistic in their choices (Hirshleifer & Shumway, 2003). Thereby they often rely on their System 1 thinking (i.e. intuitive thinking) and are thus more prone to the application of heuristics (Bless et al., 1996). For example, Murray et al. (2010) have found that consumer spending tends to increase when negative affect declines as a result of increased exposure to sunlight. Examples are also found in the
financial world. Hirshleifer & Shumway (2003), for instance, found in their study a strong correlation between sunshine and daily stock returns. Similarly, Goetzmann & Zhu (2005) looked in their study at returns on cloudy versus sunny days, but different to Hirshleifer & Shumway (2003) they could not identify any significant connections. Yet, they pointed out that such an effect was found in market makers’ spreads, where spreads would increase on cloudy days.

On the other hand, when in a sad mood, people tend to evaluate their choices more critically (Bless et al., 1996) and follow the more logical rule (Vries et al., 2012). For example, Bakshi et al. (2014) showed that restaurant recommendation ratings tended to be lower when submitted on rainy days (i.e. precipitation > 0). It also appears that weather influences the outcome of elections. A study conducted by Meier et al. (2019) revealed that rainy weather on election days favors parties with more conservative agendas. The authors explained this phenomenon with the reduced willingness to take risks on rainy days.

The effect of weather on our mood and ultimately on our decision-making is a well-known issue in the literature. Therefore, it is assumed that such an influence could also play a role in the scoring process of patient prioritization tools. With a selected set of weather variables, we attempt to control for such potential influences.

3. Research Question

This study intends to explore to what extent raters in patient prioritization tools influence the priority score that patients receive, which leads to the following research question:

How independently are priority scorings applied in the course of patient prioritization tools from the rater that conducted the scoring?

4. Data and Methods

This section starts with a description of the research setting and continues with an elaboration of the research model. It furthermore describes the sample, the data collection, and data analysis.

Our study takes place in an Austrian social facility that offers a set of services that are aimed to help and support people in psychological and social crises. One such service is the facility’s psychotherapy department. There, more than 60 therapists, both employed and in partnership with the institution, are supporting roughly 3000 people annually, either in one of its five locations or in the private practices of its partners. The state Vorarlberg is one of the main customers of this psychotherapy service. Therefore, it is mostly but indirectly financed by public resources. In turn, it can and must offer its patients affordable treatment plans, which is also why the demand for psychotherapy there is high and, as a result, its waiting lists fairly long.

In October 2020 the institution adopted a need-based waiting list strategy. This endeavor led to the introduction of an assessment center. A first contact point that determines a patient’s degree of prioritization and, ultimately, how soon one sees a therapist. The assignment of a therapist to a case is mostly random but somewhat depending on the location the patient visits. Still, a patient is usually not aware of which therapist works at which facility and can therefore not consciously decide on who will perform the scoring.

In the initial interview, patient presentations are assessed based on several different dimensions, including urgency, severity, and suffering. But other factors that were also found to be determinants of mental health, such as the social situation and age, are covered as well. These and other assessment criteria were gathered in a criteria catalog, which is depicted in Tab. 1. Additionally, to establish some sort of standardization, therapists were trained and given a detailed assessment guideline.

As presented in Tab. 1, therapists assign points within a specified range for each criterion. To control how much each component contributes to the overall score, apart from the range of points, each measure has furthermore a fixed weighting. After multiplying the points per measure with its corresponding weighting, the weighted scores are summed up and the result is the initial score that determines at what rank a patient enters the waiting list. The total clearing scores range from 0 to 122, where increasing values represent a higher level of need.

However, relevant for this study is only the sum of the raw scores (i.e. column 3 in Tab. 1; later referred to as “score sum”), which ranges between 0 and 46 and represents the dependent variable in our study. The unweighted score sum, instead of the weighted one, was chosen because it unadulteratedly reflects the judgment of a therapist on a given case. The sum, instead of one chosen criterion, because it expresses the accumulated judgment on a case. If any effects were to be found, the chances of measuring them would increase with the accumulation of all decisions made.

The score sum thus should quantify the patient’s level of need, measured through the judgment of one therapist. Yet, as discussed in the literature review, clinical judgments are sometimes inaccurate and distorted by extraneous factors. However, if the goal is to establish a fair and equitable waiting list system that considers the individual level of need, the quantification of claimed criteria, which precedes the entering of a patient on the list, must be accurate and, more importantly, independent of who scores the patient. Because in an ideal scenario, the factor therapist should not play a role in determining the patient’s need for treatment.

From the 29th of October 2020 until the 19th of March 2021, 306 incoming patients, which either directly applied or were referred by a practitioner, were assessed and added to the waiting list. 267 patients were included for the descriptive analyses since 37 cases were not attributable to a specific rater and 2 additional outliers were dropped as well. For the regression analysis, 266 observations were included, since one case offered no data on age. All variables ultimately used in this study are depicted in Tab. 2.

In the sample, 70.4% (n = 188) of patients were female and 29.6% (n = 79) male. The patient’s age ranges from 8 to 71 with a mean of 37.6 and a median of 36.0. The majority of patients were in the age group between 30 and 49 (39.5%; n = 105), followed by 19-29 (28.6%; n = 76) and 50-64 (23.3%; n = 62). The cohorts 13 to 18 made up only 4.1% (n = 11), 65 to 71 2.6% (n=7), and 6 to 12 only 1.5% (n = 5). All patients from the sample resided in the state of Vorarlberg, Austria. The sample, therefore, reflects a cross-section of the adult population in Vorarlberg.

During the study period, nine therapists were actively assessing patients. All raters were female and between the ages 35 and 60. Assessments took place in five different locations: Bludenz (8.2%; n = 22), Dornbirn (24.7%; n = 66), Bregenz (36.0%; n = 96), Feldkirch (14.6%; n = 39), and Hohenems (16.5%; n = 44).

243 out of 267 patients received a preliminary diagnosis and some of them were diagnosed with more than one mental illness. Just under half of the diagnosed disorders were attributable to neurotic, stress-related, and somatoform disorders and roughly 40% to mood disorders. The distribution of disorder types of this sample is mostly in line with the distribution on a global level, where both anxiety disorders (F41) and depression (F32-F33) are also the most prevalent types of mental disorders (James et al., 2018).
Table 1: Overview of criteria used in assessing patients' level of need

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Assessment criteria</th>
<th>Range of points</th>
<th>Weighting</th>
<th>Maximum of weighted points per category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urgency</td>
<td>Urgency</td>
<td>0-3</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Continuation of treatment after inpatient stay</td>
<td>0-1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Severity</td>
<td>GAF score</td>
<td>0-7</td>
<td>2</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Global assessment of severity</td>
<td>0-4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Suffering</td>
<td>Intensity of suffering</td>
<td>0-10</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Duration of suffering</td>
<td>0-4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current significant increase in suffering</td>
<td>0-1</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Social situation</td>
<td>Financial situation</td>
<td>0-3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social support</td>
<td>0-2</td>
<td>3</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Impact on others</td>
<td>0-2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Motivation to change</td>
<td>Motivation to change</td>
<td>0-4</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Age</td>
<td>Age</td>
<td>0-3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Capability to attend group therapy</td>
<td>Capability to attend group therapy</td>
<td>0-1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Mobility</td>
<td>Mobility</td>
<td>0-1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Sum Score</td>
<td></td>
<td>0-46</td>
<td></td>
<td>Total: 122</td>
</tr>
</tbody>
</table>

Source: developed by the authors

Table 2: Descriptive statistics of variables used in the analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score sum</td>
<td>267</td>
<td>13</td>
<td>45</td>
<td>28.91</td>
<td>5.854</td>
</tr>
<tr>
<td>Therapist B</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.18</td>
<td>.382</td>
</tr>
<tr>
<td>Therapist C</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.07</td>
<td>.258</td>
</tr>
<tr>
<td>Therapist D</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.21</td>
<td>.411</td>
</tr>
<tr>
<td>Therapist E</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.11</td>
<td>.316</td>
</tr>
<tr>
<td>Therapist F</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.03</td>
<td>.181</td>
</tr>
<tr>
<td>Therapist G</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.01</td>
<td>.086</td>
</tr>
<tr>
<td>Therapist H</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.16</td>
<td>.372</td>
</tr>
<tr>
<td>Therapist I</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.14</td>
<td>.346</td>
</tr>
<tr>
<td>Sex Patient</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.30</td>
<td>.457</td>
</tr>
<tr>
<td>Age Patient</td>
<td>266</td>
<td>8</td>
<td>71</td>
<td>37.56</td>
<td>14.119</td>
</tr>
<tr>
<td>November</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.22</td>
<td>.413</td>
</tr>
<tr>
<td>December</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.25</td>
<td>.434</td>
</tr>
<tr>
<td>January</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.24</td>
<td>.425</td>
</tr>
<tr>
<td>February</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.19</td>
<td>.394</td>
</tr>
<tr>
<td>March</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.08</td>
<td>.275</td>
</tr>
<tr>
<td>Avg. Temperature in °C</td>
<td>267</td>
<td>-6.7</td>
<td>17.0</td>
<td>3.599</td>
<td>4.1593</td>
</tr>
<tr>
<td>Precipitation in mm</td>
<td>267</td>
<td>0</td>
<td>49.4</td>
<td>3.121</td>
<td>6.8322</td>
</tr>
<tr>
<td>Atmospheric pressure in hPa</td>
<td>267</td>
<td>984.10</td>
<td>1035.60</td>
<td>1018.9079</td>
<td>10.24458</td>
</tr>
<tr>
<td>Rain</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.49</td>
<td>.501</td>
</tr>
<tr>
<td>Snow</td>
<td>267</td>
<td>0</td>
<td>1</td>
<td>.17</td>
<td>.378</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>266</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: the table describes the number of observations (N), minimum, maximum, mean, and standard deviation of the main variables used in the analysis. Variables with a range from 0 to 1 are coded as dummy variables, their mean thus indicates their actual share of observations. In the case of Sex patient, this means that 30% of patients were male, as they were coded as 1. This logic does not apply to Rain and Snow, given that on a certain day there can be both rain and snow.

Source: developed by the authors
The obtained datasets contained the score for each assessment criterion, as presented in Table 1. The addition of all criteria represents the score sum. The dimensions and their respective criteria are described as follows:

**Urgency** was measured on a scale from 0 to 3, where 0 stands for no symptomatic deterioration to be expected and 3 for severe deterioration of symptoms and potential for self-harm or harm to others. The adoption of this item was inspired by the priority criteria tool developed by Coster et al. (2007), however, it was altered to fit the mental health context. Continuation of treatment after inpatient stay was answered with a simple yes or no, where yes equals 1 and 0 no. Further treatment is mainly about stabilization after an intense mental illness. People are treated as inpatients only until they are stable. Outpatient treatment is then used for relapse prevention and long-term stabilization. Thus, former inpatient patients are prioritized in this category.

The severity dimension contained two criteria. First, a slightly modified version of the Global Assessment of Functioning (GAF) scale as described in the DSM-IV (American Psychiatric Association, 1994); in which the GAF interval receives no points and gradually down to the 30–21 interval, for which the therapist assigns the maximum of 7 points. The intervals 20–11 and 10–1 are not considered, as such severe and urgent cases are immediately referred to a crises team. Second, a greatly simplified version of the scale for the global assessment of severity (Endicott et al., 1976), which ranges from 0 to 4, where 0 represents little and 4 high severity.

A large body of research indicates that suffering adversely affects the overall psychological well-being of patients as well as the symptoms of anxiety and depression (see e.g. Cowden et al., 2021; Samelius et al., 2010). Thus, the third category measures suffering from three different perspectives. First, the intensity of suffering ranges from 0 for no psychological strain to 10 for extremely debilitating psychological strain. Second, duration of suffering, which spans from 0–6 weeks up to 1 year, with the respective points from 0 up to 4. Third, a binary item for a current significant increase in suffering, with 1 point for yes and 0 for no.

Patients with a lower socio-economic status tend to wait longer for treatment (McIntyre & Chow, 2020), yet simultaneously they suffer disproportionately more under this burden (Pathirana & Jackson, 2015), which again puts a strain on already limited health care resources. Hence the institution included the social situation in its assessment criteria, which comprises the following three aspects. **Financial situation**, for which 0 represents full ability to self-finance psychotherapy and 4 for no or not enough resources to pay for treatment. **Social support** ranges from adequate support (0) to no support (2). **Impact on others**, where 1 represents an impact on adults, 2 an impact on children, and 0 no impact at all.

Decades’ worth of research has shown that a patient’s motivation for treatment and change is a strong predictor for good treatment outcomes (see e.g. Keilhöfer et al., 1980; Sifneos, 1978). Thus, motivation to change constitutes another priority item during the assessment. It is evaluated by the scoring therapist and ranges from 0 for no motivation to 4 for highly motivated.

Given the steeply increasing prevalence rates of mental disorders among children and adolescents (Twenge et al., 2019) and the fact that early intervention and prevention have a higher probability for not only positive treatment outcomes but also improved long-term health as well as socio-economic gains (Kieling et al., 2011), the institution included the age dimension to prioritize younger patients. Patients from ages 0 to 12 receive 3 points, the age group 13 to 18 2 points, and 18 to 25 1 point. People older than 25 receive no points.

In this category, patients’ capability to attend group therapy is evaluated. If a patient is incapable, the rater assigns 1 point and 0 if a capability is given. This criterion was implemented as the mental health service offers quick and uncomplicated access to group therapy sessions for patients on the waiting list as an early intervention measure. If, however, patients are ill-suited to group therapies, they are prioritized to sooner enter single therapy sessions.

For mobility, the rater assigns a 1 if the patient is dependent on public transport to get to the therapy, otherwise a 0. This criterion encompasses two rationales. On the one hand, Vorarlberg is a small province and patients like to have the possibility to remain anonymous and visit psychotherapists further away. On the other hand, it is also about equitable access to psychotherapy treatment. Patients that live in remote areas and with limited access to public transport receive additional points to compensate for their handicap in terms of mobility.

For therapists, a database was obtained that included an alias for the therapist’s name, age, and sex, where 1 represents male and 0 female.

Another set of variables describes the metadata of the initial interview, including patient ID, evaluating therapist, and the location in which the scoring was conducted. The latter two were coded as dummy variables, i.e. every therapist and every location were assigned either 1 or 0, where 1 indicates the presence of the therapist/location and 0 otherwise. This data file was mainly used to connect the datasets for therapists and weather with the patient dataset.

To test the robustness of the results, we added several control variables including weather data. The daily weather information for each location was retrieved from the online weather database “meteostat”. However, since not every location had its corresponding weather station, meteostat calculates its data with an interpolation method, which is an approximation of the actual value. The variables for weather included in the analysis are as follows: the **average temperature in degrees Celsius**, **precipitation in millimeter**, **atmospheric pressure in hectopascal**, and the binary variables for **rain and snow**, for which a value of 1 indicates snow or rainfall on a given day, and 0 none.

To test the hypothesis, hierarchical linear regression was used, as it enables us (1) to measure if there is a statistically significant relationship (p-value) between a dependent and multiple independent variables, and if so, (2) how strongly this relationship applies ($\beta$-coefficient), by assessing and comparing the impacts of each regressor (Alexopoulos, 2010). Significance testing used $\alpha$-level .05, two-tailed tests.

The hierarchical entry of independent variables allows us to check for potential moderating effects of the controls since we can determine the order in which each block of variables is added to the regression equation (Jeong & Jung, 2016). Thereby we can analyze the changes in therapist effects with each subsequent addition of a control variable.

## 5. Results

The response variable “score sum” ranges from 15 to 45 points, with a mean of 28.9 and a median of 28.0. Standard deviation was 5.9. Tab. 3 depicts the result of each rater. The number of observations was 267 for the descriptive statistics, but only 266 in the following regression analysis, due to the missing data on age in one observation.

Fig. 1 provides further intuition for how the therapists’ scorings relate to each other by indicating the score sum distributions for each therapist via box plots. Eye inspection suggests that not all therapists assign equal scores on average. While some therapists, such as E and F, assign relatively low scores, other therapists, such as B, C, G, and H, assign relatively high scores. Therapist D and I provide interesting border cases.
In subsections 5.1 and 5.2 we check whether these apparent differences across therapists are caused by outliers or whether they constitute robust differences in rating tendencies. To this end, we report the results of the hierarchical linear regression. The results are divided into the general analysis of our hypothesis and the adjacent robustness checks.

### 5.1. Rater-based effects on the score sum

Our hypothesis was tested using a multiple linear regression model. In the first model, $R^2$ of variance in score sum was explained by therapists. ANOVA suggests that the regression model contains significant explanatory variables ($p < .001$).

The results presented in Tab. 4 confirm that there are effects on the size of the scores depending on which therapist conducts the scoring. Therapists B ($p = .007$), C ($p = .001$), and H ($p = .008$) were below the statistical significance threshold of $p < .01$. Therapist I was with a $p$-value of .012 similarly close to $p > .01$ and therefore still considered. The largest statistically significant effect sizes were recorded in therapist C ($\beta = 5.77$), followed by therapist H ($\beta = 3.84$), B ($\beta = 3.84$), and I ($\beta = 3.76$).

### 5.2. Robustness checks

In this part, the robustness of the results received in subsection 5.1 is tested. In five consecutive models, control variables were added stepwise to monitor potential fluctuations in significance and effect size.

Across all five models, the percentage that explained the variance in score sum did not meaningfully change with each subsequent addition of controls. The adjusted $R^2$ ranged from 11.5% to a maximum of 13.6%.

A similar observation was made for the results of the ANOVA table. In all five instances, the variables included in the analyses were statistically significant with $p < .001$.

In the first step, we added patients’ sex to control for any gender bias. As presented in Tab. 5, the results of the first robustness check (Model 2) indicate that the effects for therapists B, C, H, and I stay robust at their respective significance levels. Additionally, no major fluctuations in effect strength were detected. Therefore, we can conclude that in the presence of patients’ sex, the effects of certain therapists remain robust.

In the second step, we tested the potential effects of patients’ age. Note that we could not add therapists’ age due to the relatively small number of raters and thus too high multicollinearity between the two. Nevertheless, the results of Model 3 reveal similarly small

### Table 3: Measures of central tendency by therapists

<table>
<thead>
<tr>
<th>Therapists</th>
<th>Score sum</th>
<th>N</th>
<th>Mean</th>
<th>Median</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>22</td>
<td>26.5</td>
<td>27.0</td>
<td>20</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>47</td>
<td>30.4</td>
<td>28.0</td>
<td>18</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>19</td>
<td>32.3</td>
<td>29.5</td>
<td>25</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>57</td>
<td>28.3</td>
<td>29.0</td>
<td>17</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>30</td>
<td>24.8</td>
<td>27.0</td>
<td>15</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>9</td>
<td>24.7</td>
<td>27.5</td>
<td>13</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>2</td>
<td>31.5</td>
<td>30.0</td>
<td>21</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>44</td>
<td>30.4</td>
<td>28.0</td>
<td>16</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>37</td>
<td>30.1</td>
<td>30.0</td>
<td>20</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>267</td>
<td>28.9</td>
<td>28.0</td>
<td>13</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

Source: developed by the authors

The presence of therapists B, C, H, and I was found to have predictive power over the size of the score patients receive. The null hypothesis can thus be rejected.

### Table 4: Therapist-based effects on score sum (Model 1)

<table>
<thead>
<tr>
<th>Model 1</th>
<th>$\beta$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>26.545</td>
<td>.000***</td>
</tr>
<tr>
<td>Therapist B</td>
<td>3.838</td>
<td>.007***</td>
</tr>
<tr>
<td>Therapist C</td>
<td>5.770</td>
<td>.001***</td>
</tr>
<tr>
<td>Therapist D</td>
<td>1.753</td>
<td>.205</td>
</tr>
<tr>
<td>Therapist E</td>
<td>-1.745</td>
<td>.259</td>
</tr>
<tr>
<td>Therapist F</td>
<td>-1.879</td>
<td>.389</td>
</tr>
<tr>
<td>Therapist G</td>
<td>4.955</td>
<td>.224</td>
</tr>
<tr>
<td>Therapist H</td>
<td>3.841</td>
<td>.008***</td>
</tr>
<tr>
<td>Therapist I</td>
<td>3.760</td>
<td>.012**</td>
</tr>
</tbody>
</table>

Note: This table provides the coefficient estimates ($\beta$) of all rating therapists (excl. A) on the score sum (i.e. raw scores without weighting) including its respective $p$-value. Statistical significance is denoted as follows: *** for $p < .01$; ** for $p < .05$; * for $p < .10$.

Source: developed by the authors
changes in effect sizes and their respective p-values. As depicted in Tab. 5, all four of the before-mentioned therapists remained within their statistical significance threshold. The age of the patient does not seem to affect the therapist’s judgment in this case, given that therapists B, C, H, and I still have an impact on the overall score patients receive, even in the presence of patients’ age.

To control for seasonal influences and potential effects of the pandemic we added in Model 4 the months in which the scoring was conducted. As these variables were coded as binary variables, one variable had to be rejected. Since “October” had the least observations, it was the variable being excluded.

The presence of months altered the p-values of therapists and their respective effect sizes, most notably through the presence of March. Looking at Tab. 5, we find that therapist B’s effect became slightly less significant, as its p-value exceeds now the .01 level. Also, its beta coefficient decreased by .40 points (.07 standard deviations). The same applies to H, whose p-value rose .036 and was thus now above the .01 level. Accordingly, its effect size shrank by .8 points (0.14 standard deviations). In therapist I we find the opposite; its beta coefficient grew by .70 points (.12 standard deviations) and its p-value (.004) fell below the .01 significance threshold. The effect of therapist C is highly robust; neither significance nor effect size was considerably different than in earlier models.

Although the addition of months to the model caused some minor fluctuations, all raters’ effects remain significant, at least below the .05 level. The robustness of therapist C’s effect along with the statistically significant effects of the other three therapists (B, E, and I) indicates that in their case the size of the score is still associated with the presence of said therapists, even in the company of the control variables for months.

Finally, we controlled for the mood-altering effects of the weather, which are found to influence a person’s judgment. Thus, we added the variables average temperature, precipitation, air pressure as well as the dummy variables for snow and rain (see Model 5 in Tab. 5). With weather controls being added all therapists underwent minor changes in terms of effect size and statistical significance but generally remained stable.

| Table 5: Therapist-based effects on score sum including controls (Model 2-5) |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                             | Model 2                     | Model 3                     | Model 4                     | Model 5                     |
|                             | \( \beta \) \( p \)         | \( \beta \) \( p \)         | \( \beta \) \( p \)         | \( \beta \) \( p \)         |
| (Constant)                  | 26.638 .000***              | 27.598 .000***              | 26.197 .000***              | 27.664 .000***              |
| Therapist B                 | 3.821 .008***               | 3.963 .008***               | 3.423 .017**                | 3.465 .020**                |
| Therapist C                 | 5.758 .001***               | 5.699 .001***               | 5.554 .001***               | 5.760 .001***               |
| Therapist D                 | 1.723 .215                  | 1.741 .210                  | 1.310 .345                  | 1.697 .281                  |
| Therapist E                 | -1.753 .258                 | -1.761 .256                 | -2.021 .189                 | -1.479 .377                 |
| Therapist F                 | -1.887 .388                 | -1.681 .434                 | -1.922 .384                 | -1.517 .523                 |
| Therapist G                 | 4.862 .234                  | 4.748 .245                  | 5.546 .192                  | 5.622 .196                  |
| Sex Patient                 | -.256 .732                  | -.340 .650                  | -.399 .592                  | -.330 .661                  |
| Age Patient                 | -.026 .285                  | -.022 .377                  | -.019 .455                  |                             |
| November                    | .906 .733                   | .626 .820                   |                             |                             |
| December                    | .327 .901                   | .302 .918                   |                             |                             |
| January                     | 1.651 .518                  | 1.169 .674                  |                             |                             |
| February                    | 2.368 .348                  | 1.878 .483                  |                             |                             |
| March                       | 4.670 .083*                 | 4.319 .139                  |                             |                             |
| Avg. Temp.                  |                             |                             |                             |                             |
| Precipitation               |                             |                             |                             |-.010 .920                  |
| Air pressure                |                             |                             |                             |-.001 .976                  |
| Rain                        |                             |                             |                             | .245 .782                  |
| Snow                        |                             |                             |                             | 1.121 .340                  |
| \( N \)                     | 266                         | 266                         | 266                         | 266                         |

Note: This table provides the coefficient estimates (\( \beta \)) of all rating therapists (excl. A) on the score sum including the respective p-values. Added controls are depicted below the second dotted line. Statistical significance is denoted as follows: *** for \( p < .01 \); ** for \( p < .05 \); * for \( p < .10 \).

Source: developed by the authors
Fig. 2 isolates the regression coefficients from therapists showing robust divergences in rating behavior across our model specifications. Comparing the entries, we do not find that the inclusion of the control variables qualitatively changes the robustness of the predictors, as all regression coefficients remain below the .05 significance threshold at all times. Our hierarchical approach, however, allows us to add nuance to this judgment.

While we do not find that sex or age of the patient alters either effect size or significance of the respective raters, discernible changes occur when adding both the month and weather controls. Hence, the rating behavior of some therapists does appear to be connected to external or seasonal influences, although the detected overlaps are small.

![Figure 2. Significance of robust (p < .05) regression coefficients from therapists across regression models. Sex and age of the patient appear independent of assessment ratings. Month and weather, however, alter the significance of the observed effects](image)

Source: developed by the authors

6. Discussion

This paper aimed to investigate how independently the scoring results, received in the course of patient priority assessments, are of their raters.

To test the effect of raters on the resulting score and thus the objectivity of scoring results, we used a hierarchical linear regression analysis loaded with data from the assessment center of a psychotherapy service. In six consecutive models, controls were added stepwise to the regression equation. This allowed us to observe potentially moderating effects of the control variables on therapists’ effects. Overall, the percentage of variance in scores that was explained by the entered variables was low across all models (R² ranged from 11.5% to 13.6%). Although it was not the goal of this study to find all factors that fully explain the variance of the score, the low R² nonetheless indicates that at least other factors not included contain far more explanatory power over the size of the score. This notion was quickly tested in a separate regression analysis that used the results of all priority scoring items as independent variables. The results there showed that the variance of scores was, of course, fully explained by the priority criteria (R² = 1.0). Regardless, the significance levels received in the ANOVA table, suggest that the performed regression models provide indeed an explanatory contribution.

In an ideal scenario, the presence of a specific rater should not affect the size of the score that patients receive. The findings of this study, however, indicate that such effects are indeed present. In the main analysis (model 1), we exclusively observed the raters’ effects, without adding any controls yet. The results confirmed the idea that scores are not independent of their rater. Four therapists were found to have statistically significant effects (3 with p < .01 and 1 with p < .05), with the biggest effect size at 5.77 (therapist C). This means that the mere presence of this specific therapist adds on average 5.77 points to the unweighted score sum of the respective patient. To put this in perspective 5.77 equals almost 1 standard deviation (.98 standard deviations) of the scores measured in this sample.

To further illustrate the magnitude of what 5.77 points mean in days waited on the waiting list, we conducted a quick back-of-the-envelope calculation. Note that our analysis used unweighted scores, thus we have to add the weighting, which varies across the criteria but on average adds 3.4 points for each point given. Multiplying the coefficient with the average weighting equals roughly 20 points. Then we looked at one of the patients that were scored by therapist C and already assigned to a treatment, so we can determine the number of days spent on the waiting list. One patient we found entered the waiting list on the 3rd of November, had an initial (weighted) score of 65, and waited 43 days on the list. Adjusting the patient’s score by the therapist effect would result in only 45 instead of 65 points. For comparison, we picked a patient of another therapist, who did not show statistically significant effects. The other patient we found entered the waiting list on the 9th of November, had an initial (weighted) score of 43, but waited 77 days until that person received treatment. Thus, the patient waited more than a month longer for treatment, simply because that person was not rated by therapist C. We do not claim that this calculation is highly accurate nor sophisticated, also how soon patients leave the waiting list is slightly dependent on the availabilities of therapists, yet it is an approximation and illustrates our argument.

In the following four models, we added stepwise the controls. As the patient’s sex, caused no substantial fluctuation in effect...
sizes, indicating the absence of gender bias in our sample. However, due to all therapists being female, we cannot say if a different picture would have emerged, when male raters had been present. We assume that if such gender-related effects were indeed existent, they would only be measurable at the level of the respective priority criterion. For example, the study of Eerp et al. (2019) showed that boys were rated to experience more pain than girls, even though they showed the same symptoms. We quickly tested with an additional regression analysis if this applies to our sample too. However, the results show that the effects of therapists’ ratings for intensity of suffering do not change with patients’ sex being added to the regression. Still, we encourage future studies to conduct investigations of potential biases also at the sublevel, i.e. regression analyses with the priority items as dependent variables.

When controlling for patients’ age, we again found no fluctuations in effect sizes that would be indicative of any bias towards age. Due to multicollinearity between therapists and their age we could not assess if age on the rater side would affect the scores.

However, when we added the months to the model, we noticed some changes in p-values and effect sizes, although all effects of therapists that were measured before to be statistically significant also remained significant at p < .05. To our surprise, the month of March showed to have a significant effect (p < .1) on the size of the score, even though not strong, it was still greater compared to other months. It must be mentioned that the number of ratings recorded in March, due to the cut-off point for sample collection on the 19th of March, was only a third of the number of ratings in other months (on average 59 ratings per month). However, as discussed in subsection 2.2, we cannot exclude the possibility that the effect recorded in March is attributable to the increased prevalence of SAD in winter months (Magnusson & Bolvin, 2003) or the general increased prevalence rates of mental disorders in winter (Graaf et al., 2005) and spring (Slaunwhite et al., 2019). Similarly, it could also be caused by overall deteriorated mental health due to the effects of the Covid-19 pandemic, as expressed by some authors (Adams-Prassl et al., 2020; Pileh et al., 2020; Rossi et al., 2020). Regardless, the observed impact of March vanishes in the subsequent models, suggesting little robustness of the effect.

As shown in 2.2, many authors have pointed out that weather influences our mood, and mood, in turn, influences our decision-making. However, in this research, we could not identify any effects due to certain weather phenomena, as no substantial effect changes were detected when weather controls were added. In other studies, authors investigated the influences of sunny (Hirdleifer & Slumway, 2003; Murray et al., 2010) and cloudy (Goetzmann & Zhu, 2005) weather on our decision-making. Unfortunately, we had no access to data such as sunlight or cloudiness.

Overall, we can answer our proposed research question by demonstrating that the effects of therapists on the size of the score are indeed measurable and that these stay relatively robust in the presence of the included controls. The example provided earlier has demonstrated how this effect can prefer or discriminate one patient over another, simply by being rated by two different therapists. However, if this effect is also measurable in other settings, and therefore truly reliable, can only be determined in future studies. Also, to what extent certain heuristics and biases, as well as other imperfections of the clinical judgment, led to these outcomes can only be revealed in upcoming experiments that limit their research focus on the detection of biases in patient priority assessments. Although the controls used in our analysis considered a few of the potential biases, they could not explain the observed deviations in our sample. In general, we find that the concept of rater bias was given much attention in other areas but not in patient prioritization tools and even less so for the ones employed in a mental health context. An issue that needs to be studied more thoroughly in the future, as our results demonstrate.

On a final note, our findings add to the literature that described the questionable reliability and validity of patient prioritization tools (Déry et al., 2020; Harding & Taylor, 2013), by indicating the influence that therapists have on the outcome of priority scorings. This research is also highly relevant for practitioners, as it provides valuable knowledge about the weakness of such ratings. Given the findings in our analysis, we recommend that further training of therapists could reduce the stated effects, as suggested by Harries & Gilhooly (2011). Thereby, the training would be most effective if it educates about the decision-making processes and the inherent pitfalls (Bell & Mellor, 2009). Ultimately, this would facilitate better decision-making and thus provide increased reliability and validity of patient prioritization tools.

This study is not without limitations. Additional to the ones already mentioned in the discussion, further limitations that need to be considered are listed below. First and foremost, we cannot tell to what extent the actual level of need of patients has caused the results in the four therapists with statistically significant effects. it might be that these therapists stood out simply because they were incidentally assigned cases that had indeed more severe symptoms or fulfilled any other priority criteria relevant in the scoring, compared to the ones of their peers, which resulted in them assigning on average higher scores to their patients. This makes the internal validity of the study to some extent questionable. Future research would be well advised to find methods that control for the actual level of need. Due to limitations in data availability for individual therapists, our analysis cannot claim to provide a comprehensive overview of rater discrepancies. To a lesser extent, this concerns therapists identified as divergent from the rest of the sample. While for Therapist B, H, and I, we have more than 30 observations each, we have only 19 observations for therapist C. Although the respective rater-fixed effect is highly robust (p < .001), further observations would help bolster the meaningfulness of the detected effects. To a larger extent, data limitations concern therapists for which no effect has been identified. As the results suggest that therapists F and G assign, on average, the lowest and highest ratings, respectively, and would thus be natural candidates for receiving stronger attention. Yet, likely due to low sample sizes of 9 and 2 observations for therapists F and G, our analysis does not flag the rating behaviors as exceptional. Hence, although our analysis can confirm our main hypothesis by reliably detecting some assessment biases, it can likely not detect all of them.

Another limitation is the novelty of the tool used at the institution. The involved therapists were confronted with an entirely new and standardized technique to determine a patient’s level of need. Although they were trained prior to the introduction of the tool, they could perhaps require further familiarization with the way that a patients’ priority is assessed now. The lack of experience might therefore have threatened the content validity of the priority criteria, i.e. therapists might have interpreted the items differently or falsely. We advise the institution’s stakeholders to run the analysis again sometime in the future.

External validity (i.e. generalizability) might be somewhat limited too, in particular for two reasons. First, the sample data was collected using a consecutive sampling method. Although this method is less prone to sampling bias than simple convenience sampling (Schuster & Powers, 2005) it still falls into the category of non-probability sampling methods, which are more likely to produce biased samples (Suresh, 2014). Second, the sample includes only patients from semi-rural areas, which makes generalizing these findings to urban regions a bit problematic, given the differing demands and conditions.

A final limitation might be that the results are based on secondary data. As Kimberlin & Winterstein (2008) have pointed out, secondary data is usually collected for a different purpose. Although we are confident that the data collected was appropriate to answer the research question, we cannot exclude the possibility that some data was falsely recorded in the institution’s client information system, from which the data used in this study originates.
7. Conclusion

his study aimed to investigate rater-based effects in the scoring results of patient prioritization tools utilized in mental health services. Based on the results of the hierarchical linear regression, we can conclude that some therapists indeed demonstrate to have a statistically significant influence over the size of the resulting priority score. The results further indicate that these effects can lead to unwanted discrimination and consequently to unjustifiably prolonged waiting times for some patients, which thwarts the idea of a fair and equitable prioritization of patients. Based on the conclusions, practitioners should consider further training of raters, with a particular focus on the pitfalls involved in decision-making processes. Since our study could not identify the causes for these effects, we encourage other researchers to more thoroughly investigate biases that may lead to such effects. Our study has contributed to the notion of previous research that the quality of patient prioritization tools is sometimes worrying. Furthermore, our insights add to the literature on inconsistent clinical judgment, and even more so they provide much-needed information about the quality of patient prioritization tools used in mental health settings.

8. Funding

his study received no specific financial support.

9. Competing interests

n accordance with publisher policies and our ethical obligations as researchers, we report that one of the authors is employed at a company that may be affected by the research reported in the enclosed paper. We have disclosed those interests fully.

References


Strategy for Improving Crowdfunding Investments in Startup Business

Purpose: This research was conducted to analyze the extent to which online customer reviews (OCR,) can stimulate investment backers as a strategy to increase crowdfunding investment.

Design / Method / Approach: This research is quantitative. Natural language processing (NLP) processes review text documents based on linguistic study, a lexicon-based method is used for sentiment analysis classification based on polarity score (pros and cons), while Multiple linear regression forms a model or relationship between online customer reviews and crowdfunding investments. OCR consisting of numeric and text features were collected from one hundred technology products (3D printing, drones, cameras, wearables) on Kickstarter.com.

Findings: The study results show that, in addition to positive reviews, the number of comments and the number of sentiment reviews can increase consumer interest in investing in technology products on the crowdfunding platform. Moreover, positive reviews have the most positive effect on crowdfunding investments.

Practical Implications: The study results are expected to be used for startup business, especially technology products as a strategy to increase funding investment on a reward-based crowdfunding platform. Startups can take advantage of online customer reviews as one of important factors in stimulating potential backers and backers to invest.

Social implications: The strategy of utilizing online customer reviews can be used especially for technology product-based startup business to get funding support as a resource in completing a product development stage.

Originality / Value: The novelty of this research is that it focuses on a technological product development stage, product campaigns on a reward-based crowdfunding platform, considering online customer reviews through sentimental (online reviews) and numerical characteristics (number of comments, number of sentiment reviews) simultaneously as a strategy to increase investment.

Research Limitations / Future Research: This study has some limitations as it used only online customer reviews as an attribute that affects crowdfunding investment. Future research is expected to explore online customer reviews to determine important attributes (unique words) as consideration for strategies to increase crowdfunding investment.

Paper type: Empirical

Keywords: crowdfunding, startup business, online customer reviews, sentiment analysis, natural language processing.

Reference to this paper should be made as follows:
Стратегія покращення краудфандингових інвестицій у стартап-бізнес

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Мета роботи: Це дослідження було проведено, щоб проаналізувати, наскільки онлайн-огляди клієнтів (OCR) можуть стимулювати спонсорів інвестицій як стратегію збільшення інвестицій у краудфандинг.

Дизайн / Метод / Підхід дослідження: Це дослідження є кількісним. Процеси обробки природної мови (NLP) перегонають текстові документи на основі лінгвістичного дослідження, метод на основі лексики використовується для класифікації настроїв на основі оцінки полярності (за і проти), тоді як множинна лінійна регресія формує модель або зв'язок між відгуками клієнтів в Інтернеті та краудфандинговими інвестиціями. OCR, що складаються з числових і текстових функцій, були зібрані зі ста технологічних продуктів (3D-друк, дрони, камери, носії) на Kickstarter.com.

Результати дослідження: Результати дослідження показують, що, крім позитивних відгуків, кількість коментарів і кількість відгуків про настрої можуть підвищити інтерес споживачів до інвестування в технологічні продукти на платформі краудфандингу. Більше того, позитивні відгуки найбільш позитивно впливають на краудфандингові інвестиції.

Практична цінність дослідження: Очікується, що результати дослідження будуть використані для стартап-бізнесу, особливо технологічних продуктів, як стратегії збільшення інвестицій у фінансування на краудфандинговій платформі, заснованій на винагородах. Стартапи можуть скористатися перевагами онлайн-відгуків клієнтів як одним із важливих факторів стимулювання потенційних спонсорів і спонсорів, вже готових інвестувати.

Соціальна цінність дослідження: Стратегія використання онлайн-відгуків клієнтів може бути використана особливо для запуску бізнесу на основі технологічних продуктів, щоб отримати фінансову підтримку як ресурс для завершення етапу розробки продукту.

Оригіналість / Цінність дослідження: Новизна цього дослідження полягає в тому, що воно зосереджується на етапі розробки технологічного продукту, продуктових кампаніях на краудфандинговій платформі, заснованій на винагородах, враховуючи онлайн-відгуки клієнтів через сентиментальний аналіз (огляди в Інтернеті) та числові характеристики (кількість коментарів, кількість оцінки настроїв) одночасно як стратегія збільшення інвестицій.

Обмеження дослідження / Майбутні дослідження: У цьому дослідженні є деякі обмеження, оскільки відгукана інформація від клієнтів є атрибутом, який впливає на інвестування в краудфандинг. Очікується, що майбутні дослідження будуть вивчати відгуки клієнтів в Інтернеті, щоб визначити важливі атрибути (унікальні слова) для розгляду стратегій збільшення інвестицій у краудфандинг.

Тип статті: Емпіричний

Ключові слова: краудфандинг, стартап-бізнес, онлайн-відгуки клієнтів, аналіз настроїв, процеси обробки природної мови.
1. Introduction

The Industrial Revolution 4.0 is a leap in the industrial sector where information and communication technology utilizes efficiency and creates new business models based on digital technology. Crowdfunding is an example of a new market model. Crowdfunding is a method of collecting funds from a large number of people to finance a project or business via the Internet (Bal, 2018). Early stages of development stimulate interest in a new product (Mollick, 2014). The increase in crowdfunding funds occurs almost every year. The crowdfunding model developed is based on financial ecology, such as: reward-based, equities, P2P lending, donation-based, fixed incomes. Reward-based crowdfunding is represented by Kickstarter platform. Kickstarter is a crowdfunding-based platform that attracts the attention of start-up business and individuals, because of its ability to help creative projects to realize their ideas by involving millions of people around the world in fundraising (Kickstarter, 2018). As it is known, the success of a product in reward-based crowdfunding is determined by the percentage of achievement of pledged funds (Pasmawati et al., 2018). In 2020, it was evident that crowdfunding transactions were promised to reach 55.5 billion (Kickstarter, 2020). However, as many as 79.34% experienced a very high technology product failure rate (Pasmawati et al., 2020).

In contrast to other types of platforms that provide rating and a similar menu as a review, qualitative crowdfunding (text) uses a comment menu as online customer reviews (OCR). On a crowdfunding platform, OCR are used as a stimulant to express views about the pros and cons of backers. OCR, are used in various studies for product sales and purchasing and the research decisions (Forman, Gohse, & Wiesenfeld, 2008; Chintagunta, Gopinath, & Venkataraman, 2011; Fan, Che, & Chen, 2017; Li, Wu, & Ma, 2019). OCR can first be considered thoroughly before potential backers decide to invest. OCR, are a reliable source of product quality information (Pasmawati et al., 2020). Taking into account reviews and advertisements, reviews are more likely to be trusted by customers who have no experience or knowledge of a target product. This indicates that OCR are considered to be the mainstream of future product sales (Hu, Liu, & Jennifer, 2008).

Several previous studies have discussed OCR. Murillerlelie and Joenssen (2015) and Mollick et al. (2014) used comments as a predictive attribute to determine crowdfunding success. The research by Cordova, Dolci, & Gianfrate (2015) used comments to find out the impact of overfunding on technology product campaigns. Wang et al. (2018) showed that positive reviews, number of comments, and response time have a significant effect on crowdfunding success. However, the lack of previous research has not focused much on future technology product launches and has not explicitly considered the numerical and sentimental characteristics of OCR simultaneously as a crowdfunding investment strategy.

In this study, to influence crowdfunding investment, we recommend analyzing the extent to which the attributes of OCR can stimulate backers. In addition to public opinion surveys, in this study, the predictor variables are used as sentiment volume and volume reviews. Kickstarter conducts research on high-tech product launches. The crowdfunding platform menu provides text reviews (comments) to give feedback on online customer reviews. Comment text is an open text description of backers’ opinions about the product or service (Jin et al., 2019). Sentiment analysis (SA) is a method that can extract text data from several sources (Sharda et al., 2014) automatically (Hafroushi & Hasan, 2018; Alrefai, Faris, & Aljarrah, 2018). Nasukawa and Yi were the first scientists to introduce SA (Nasukawa & Yi, 2003). Sentiment analysis is Natural Language Processing (NLP) as Linguistic Studies. The proposed model not only summarizes sentimental texts (positive or negative) but also analyzes a numerical feature relationship model using multiple linear regression.

Our results provide important insights into product launches and crowdfunding platforms for considering reviews. Startup business should respond positively and promptly to questions in the comments menu and ask them to provide positive OCR, for backers. Our research structure helps platform companies to formulate active strategies. Focus is on the most important aspects of feedback and moderation to improve comments without destroying comment data. We also demonstrate innovative methods for analyzing textual and numerical data to aid in these future studies. The information contained in OCR, provides a clear understanding of how startup business can help develop investment strategies on crowdfunding platforms.

This paper contains several sections, namely: section 2 deals with a problem statement, section 3 contains data collection and research methods, section 4 focuses on results and discussion of the research and evaluation of the impact of OCR, from previous studies. Section 5 contains conclusions and implications in considering strategy crowdfunding campaigns on technology products in the future.

2. Problem Statement

The purpose of this research is to analyze the extent to which online customer reviews (OCR) can stimulate backers to invest in startup business on online crowdfunding platforms as one of the strategies to increase crowdfunding investments.

3. Data and Methods

This research consists of three stages: (1) data collection, (2) classification of sentiment reviews, (3) development of a model of the relationship between variables. Python 3.7 is an open-source programming language. Python 3.7 is used for data collection (text mining and scraping), process review text documents (sentiment analysis) from text mining and development of a relationship model between variables.

3.1. Data Collection

Data is collected from Kickstarter.com. Kickstarter was selected as it is a reward-based crowdfunding platform to help creative projects on startup to achieve funding at the early stages of product development. Apart from being reward-based (products, merchandise, visiting workshops, trainings), Kickstarter also has different characteristics from other crowdfunding platforms (Indiegogo). Product campaigns are declared to be successful while being funded ≥100%. Products are unsuccessful to be funded if they do not reach 100% of the funding target.

The research object is technology products (3D printing, drones, cameras, wearables). The selection of technology products is based on the same characteristics (tangibles, goods). Technology products are one of the largest campaigns on the number of products and the second highest unsuccessful funding rate on Kickstarter. The research data set was sourced from 100 tech products on Kickstarter.com. 34,006 comments (OCR) were collected and divided into 62,072 comment sentences (OCR) to identify perceptual processing (Pasmawati et al., 2020). The data collection set uses scraping and text mining methods, as shown in Fig. 1. The data set used is online customer reviews (OCR) in the form of textual and numeric features. The textual features are backers’ reviews, while the numerical features are the number of comments (backers, creators’), the percentage of pledged funding (Ci).

In this case, the success of a product campaign is determined by the percentage of achieving the target funding ≥ 100 percent, while the target funding amount (nominal) is determined by the needs of start-up business without any limitations from an online crowdfunding platform as a mediator.
3.2. Sentiment Analysis Method

Natural language processing (NLP) is linguistic science. Natural Language Processing (NLP) is used to identify sentimental sentences (Feldman & Sanger, 2007). Sentiment analysis is used as an analytical technique to detect opinions from a number of documents. SA is able to express customer opinions automatically and quickly (Bafna & Toshniwal, 2015; Alrefai et al., 2018). This study uses three stages of sentiment analysis, namely: (1) input data review, (2) sentiment classification, (3) sentiment evaluation.

The first stage includes the process when online customer reviews (textual) generated from text mining are split into sentences and saved in CSV format. At the second stage, a lexicon-based classification approach is used to reveal whether sentimental sentences about product campaigns have positive or negative sentiments through a polarity score (Alrefai et al., 2018). The polarity score (Ps) of each OCR is a representation of backers’ pros, cons and neutral attitude. Positive sentiment (Us) occurs when Ps > .00. On the other hand, negative sentiment (Us) occurs if the score Ps < .00, and if Ps = .000, then the review has a neutral sentiment. This study uses the representation of pros and cons only. Sentiment lexicon is divided into two approaches, namely dictionary and corpus based. The dictionary-based approach starts with an initial collection of sentiment words with known positive and negative orientations. Then an available thesaurus and corpora like WordNet to find synonyms and antonyms for each word are used. The third stage is the evaluation stage of sentiment analysis using a lexicon-based approach and expert judgment. The lexicon-based approach does not require training data and utilizes a WordNet dictionary, so that sentiment evaluation is based on a resulting classification method, namely the polarity score. Expert judgment is used for the accuracy of sentiment analysis results.

3.3. Model Development

This study uses a lexicon-based approach to analyse backers’ opinion through the polarity score. Sentiment classification using the lexicon-based method shows the sentiment of each sentence review (positive, negative) and the number of sentiments of each product (sentiment volume). This result is used as a predictor variable, namely the variable of online customer reviews. The number of comments as a review in the form of numerical features is also used as a predictor variable. Based on the predictor variables that have been determined above, this study develops a model of the relationship between the predictor variables (sentiment reviews, sentiment volume, the volume of comments), and crowdfunding investments (funded) are related to each other. Multiple linear regression is a linear regression model that is suitable for analysing the relationship of three predictor variables (sentiment reviews, sentiment volume, the volume of comments). This study tested the relationship between the variables simultaneously and partially. The research model is shown in Fig. 2. Crowdfunding investments and predictor variables (sentiment reviews, sentiment volume, the volume of comments) are related to each other based on the model.

\[ C = \beta_0 + \beta_1C_1 + \beta_2C_2 + \epsilon \]

(1)

**Source:** developed by the authors

The regression line equation based on the least square method is used to predict C through the relationship and influence of predictor variables. Measurement of the rate of change of crowdfunding investments requires a multiple determination coefficient (R-Square) described by the response attribute. The coefficient of determination is 0 ≤ R² ≤ 1 which reaches the upper limit when the data is complete. The predictor variables have a very strong influence on the response variable if the value of R² is close to 1. On the other hand, the effect of the predictor variables on the response variable is small if R² is close to 0.

The strong and weak relationship between the variables is shown from a P-value. The higher the P-value is, the stronger the relationship between the variables is. The same is true for the influence of the variables, the higher the R-Square is, the stronger the predictor variables affect C. The P-value is used to analyse the relationship between affective variables. If the P-value > .05, it indicates that the predictor variable has a close relationship with the response variable and vice versa. The formulation of the regression equation (1), as follows.

**Source:** developed by the authors

![Figure 1. Research data on kickstarter](Image)

![Figure 2. Research model](Image)
4. Result and Discussion

4.1. Sentiment Reviews Analysis

The results of the polarity score show that the number of positive sentiments is 67.19% and negative sentiments are 32.81%. For example, the results of the Ps are shown in Fig. 3. The summary of the number of sentiments showing the number of an overview of 100 technology products can be seen in Fig. 4. Based on the data in Fig. 3 and Fig. 4, it is known that the number of sentiment reviews of a product varies. The highest number of positive reviews was 1406 OCRw, namely product-95, while the lowest was product-99. It is also known that the highest number of negative reviews was 693 OCRw, namely product-49, while there were 11 products that did not have negative reviews.

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Source: developed by the authors

Fig. 5 shows that sentiment reviews reach 58% of success in achieving investment/funding targets which are influenced by $U_i^e > U_i$. The resulting success percentage has a small difference compared to the success percentage affected by $U_i^p < U_i$. This percentage concludes that further analysis is needed regarding sentiment reviews to determine the correlation between sentiment review variables. The findings by Salganik et al. (2006) and Salganik & Watts (2008), suggest that backers’ investment support is indicated by positive reviews. This statement needs to be proven and analyzed as described in the section.

4.2. Sentiment Volume Analysis

Sentiment volume analysis was conducted to determine the relationship and influence of the number of positive, negative reviews, and the combined number of sentiment reviews (Fig.6). A sentiment review value uses a relative value with normalization in the form of log. Regression analysis shows that the relative of positive ($R_iU_i^{+}$) and negative ($R_iU_i^{-}$) reviews has a weak relationship with crowdfunding investments ($R_i^2$ close to 0; $P_{value} < .05$). Regression analysis also shows a significant and strong relationship and effect on the $C_i$ ($R_i^2$ close to 1; $P_{value} > .05$). Regression analysis also shows that the relative of combined sentiment ($R_iU_i^{+}$) has a significant and strong relationship and influence on $C_i$ ($R_i^2$ close to 1; $P_{value} > .05$).

Increasing sentiment volume can be done by stimulating positive backers’ opinions in the comments menu as a review. In addition, creators or startup business can trigger backers to provide positive opinions through positive text questions and respond to backers’ reviews. The creator’s quick response can avoid an excessive number of negative opinions that can have a negative impact on backers’ support in the future. This is confirmed by Yoo & Gretzel (2011) and Bradley, Sparks, Weber (2015) that reviews are feedback and can be altruistic as motivation for subsequent customer information sharing.
Successful achievement of crowdfunding investments based on sentiment reviews

**Source:** developed by the authors

Furthermore, based on the results of the percentage of success in achieved funding through crowdfunding investment data, it is known that 100 technology products have a success percentage of 61% for the U_r predictor. Meanwhile, based on the predator U_r, it shows the success of 78%. This shows that U_r and U_r have an effect on the achievement of crowdfunding investments in technology products. In previous studies, positive reviews were able to increase purchase (Bambauer-sachse & Mangold, 2013; Floyd et al., 2014; Li et al., 2019; Ullah et al., 2016; Zhang et al., 2019). In this study, apart from the number of positive reviews, the number of combined sentiment reviews also affects crowdfunding investment.

### 4.3. Comment Volume Analysis

Comment volume (C_v) is the number of comments consisting of reviews by creators/startup business and backers. This data is obtained in the comment’s menu on a crowdfunding platform in numerical form. Based on the correlation results in Fig. 7, there is a strong influence and relationship between C_v and C_v (R^2 is close to 1 and P value > .05). These results also indicate that it is necessary to consider comment volume as a predictor that affects the amount of investment in online crowdfunding.

**Source:** developed by the authors
In addition to showing the credibility of a product, the number of comments is also able to stimulate future backers to access the comments menu and seek information, as well as participate in continuing the form of opinion reviews. These comments can directly affect backers so that it can increase backers’ desire to invest in crowdfunding platforms. The increase in a number of comments can be done by actively answering backers’ questions quickly on interaction in the comments and stimulating a product campaign. Therefore, coordination between crowdfunding platforms (intermediaries) and startups (creators) to implement strategic initiatives, focusing on relevant feedback aspects without manipulating survey data, is critical in achieving crowdfunding investment goals. This confirms that a comment (review) is one of the success factors of crowdfunding.

4.4. Model Evaluation

Based on the analysis of the regression model, it is shown that there is a very significant correlation between online customer reviews (OCR) and investment crowdfunding. This is evidenced by the significance value <.05 and the coefficient of determination ($R^2 = .838)$. Regression analysis also shows that most of the achievements of crowdfunding investments are explained by the OCR variable, which is 70.28% and a small portion, namely 29.72%, is explained or influenced by other variables. (Adjusted $R^2 = .694; R^2 = .703$). It can be concluded from the results that positive sentiment reviews have a significant influence on crowdfunding investments and have the highest relationship and influence of OCR. ($t_{stat} = 2.033; P_{value} = .982$). The sentiment information review shows the results of backers’ product evaluation. Responsive or unresponsive startup business interactions will determine the number of comments and have an impact on crowdfunding investments. OCR, are information received and perceived by backers in the past. Positive reviews show enthusiasm and confidence in the products offered. The regression model that is formulated on invested crowdfunding is shown in Fig.7.

Crowdfunding Investments $= 0.782 + 0.036(\text{pos}_{\text{sentiment review}}) + 0.248(\text{sentiment volume}) + 0.447(\text{comment volume})$

This formulated regression shows that the higher the OCR, the higher the number of crowdfunding investments from backers is (Coef. .782). From a backers’ point of view or perspective, supporting comments listed on the platform are information that can influence subsequent supporting investment decisions. Compared to previous research on crowdfunding platforms, the length of a review, positive reviews, and the speed of comments affect the success of a product on a crowdfunding platform (Wang et al., 2018). This research indicates that, apart from numerical features, text features of OCR, have a positive influence on crowdfunding investments. Moreover, the text feature in the form of positive sentiment reviews has a very significant influence compared to other OCR attributes. However, a combined number of sentiment reviews (pros and cons) also needs to be considered to provide accurate experience information from backers to potential backers.

5. Conclusion

This study concludes that online customer reviews (OCR) can stimulate backers to decide whether or not to invest in a crowdfunding platform. It is proven that OCR, have a significant influence on crowdfunding investment. The findings of this study also show that the positive review attribute is the most significant attribute of all OCR, attributes. The cumulative number of positive and negative sentiment reviews is also considered in the strategy of increasing investments on an online crowdfunding platform. OCR, have not only a numerical feature (comment volume) but also a textual feature that provides information based on the opinions of real backers in the form of positive or negative sentimental reviews.

The results of the study are expected to be used for startup business, especially technology products as a strategy to increase funding investment on a reward-based crowdfunding platform. Startups can advantage and be responsive to OCR. as one of important factors in stimulating potential backers and backers to invest. The strategy of utilizing OCR, can be used especially for technology product-based startup business to get funding support as a resource in completing a product development stage.

This study has some limitations as it used only online customer reviews as an attribute that affects crowdfunding investment. Future research is expected to explore online customer reviews to determine important attributes (unique words) as consideration for strategies to increase crowdfunding investment.

6. Funding

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7. Competing interests

The authors declare that they have no competing interests.

References


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Managerial Competencies and Firm Performance in the Furniture Manufacturing Sector in Kenya

J. Were‡

Purpose: The study aims to examine the contribution of managerial competencies with indicators, namely leadership, employee development, decision making, succession planning and governance to the performance of the furniture manufacturing sector with firm size and firm age as a moderating variable.

Design / Method / Approach: The study adopted a descriptive and explanatory research design of which a sample of 280 licensed firms was randomly selected. Structured questionnaires were distributed to the managers and a factor analysis was used to reduce the number of variables and find out the underlying constructs while the analysis of moments of structures was applied to develop a theory.

Findings: The study found that managerial competencies and firm performance had a positive and statistically significant contribution. The moderating effect of firm size and age on firm performance was found negative predicting that the variable had no moderating influence on firm performance.

Theoretical Implications: This study concludes that to enhance firm performance measured in terms of profitability and growth there is need to manage and sustain firm performance based on leadership, employee development, decision-making, succession planning and governance to create competitive advantages through an effective strategy implementation process.

Practical Implications: This study will not only add value to the existing body of knowledge in strategic management practice but also point out that while implementing the strategy, CEOs and senior managers should consider these factors in order to improve firm performance.

Originality / Value: This study is unique since it provides an expansion of the conceptualization of a managerial competency framework.

Research Limitations / Future Research: The study findings are solely based on the views of managers/owners and therefore, the results are prone to managers’ bias. Thus, more studies should incorporate other stakeholders, namely consumers, suppliers and dealers. The study is only based on furniture manufacturing firms in eight counties and therefore, generalizability of the findings could be limited to only the eight counties. Thus, more studies should be carried out to include other counties making the study more national.

Paper type: Empirical

Keywords: leadership, employee development, decision-making, succession planning, governance and management systems.

Reference to this paper should be made as follows:

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Управлінські компетенції та ефективність діяльності фірми в секторі виробництва меблів у Кенії

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Мета роботи: Дослідження має на меті вивчити вплив управлінських компетенцій за допомогою таких індикаторів, як лідерство, розвиток співробітників, прийняття рішень, планування спадкоємності та управління, на результати діяльності сектора виробництва меблів з розміром фірми та віком фірми як модеруючою змінною.

Дизайн / Метод / Підхід дослідження: У дослідженні було використано описовий та пояснювальний методи дослідження, для якого випадковим чином було відібрано вибірку з 280 ліцензованих фірм з виробництва меблів. Менеджерам було запропоновано заповнити структуровані анкети; факторний аналіз використовувався для зменшення кількості змінних і виявлення основних змінних, а аналіз моментів структур використовувався для розробки теорії.

Результати дослідження: Дослідження показало, що управлінські компетенції та результативність фірми мали позитивний і статистично значущий внесок. Помірний вплив розміру та віку фірми на результативність фірми було виявлено негативним, передбачаючи, що зміна не мала пом'якшувального впливу на результативність фірми.

Теоретична цінність дослідження: У цьому дослідженні робиться висновок, що для підвищення ефективності фірми, вимірюваної з точки зору прибутковості та зростання, необхідно керувати та підтримувати роботу фірми на основі лідерства, розвитку співробітників, прийняття рішень, планування спадкоємності та управління, щоб створити конкурентні переваги за допомогою ефективного процесу реалізації стратегії.

Практична цінність дослідження: Це дослідження не тільки додає цінності наявним знанням у практиці стратегічного управління, але також вкаже, що від час реалізації стратегії генеральні директори та керівники вищих екіпажів повинні враховувати ці фактори, щоб покращити результати діяльності фірми.

Оригінальність / Цінність дослідження: Це дослідження є унікальним, оскільки вони розширюють концепцію системи управлінських компетенцій.

Обмеження дослідження / Майбутні дослідження: Результати дослідження грунтується виключно на поглядах менеджерів/власників, тому результати схиляються до упередженості менеджерів. Таким чином, додаткові дослідження повинні включати інших зацікавлених сторін, а саме споживачів, постачальників і дилерів. Дослідження базується лише на фірмах з виробництва меблів у восьми округах Кенії, тому узагальнення результатів може бути обмежено лише вісімма округами. Таким чином, слід проводити більше досліджень, щоб включити інші округи, зробити дослідження більш національним.

Тип статті: Емпіричний

Ключові слова: лідерство, розвиток співробітників, прийняття рішень, планування спадкоємності, управління та системи управління.
1. Introduction

ο be successful and remain in business, both profitability and growth are important and necessary for a firm to survive and remain attractive to investors and analysts. Profitability is, of course, critical to firm’s existence, but growth is crucial to long-term survival. Firm performance is measured by the degree of satisfaction on the levels of profitability and sales turnover. Growth for business is essentially an expansion, making a firm bigger, increasing its market and ultimately making it more profitable. Measuring growth is possible by looking at some pertinent statistics, such as overall sales, number of staff, market share and turnover (Barnut, 2012; Rylkova, 2015).

The manufacturing sector is viewed as the key to addressing the unemployment challenge in Kenya and transforming the country into an industrialized nation status. Being an agricultural country, furniture manufacturing presents the best opportunity for growing the manufacturing sector. Unfortunately, the manufacturing sector has an underperformed failing to realize its full potential due to low skill levels and lack of technological capabilities. It is also contended that firm level research that would facilitate efficient and effective resource mobilization, allocation and utilization, as well as encourage firm growth and socio-economic transformation, is lacking among manufacturing firms. Therefore, managerial competencies are considered the best way to promote the stagnating furniture manufacturing sector because value creation results in a better-balanced economic structure and increased competitiveness is the route towards import substitution and export promotion (Berko O. Damouh, 2013).

The world economy has been globalized due to technological advances, scarcity and abundance of resources in many parts of the world, plus moving knowledge and expertise in the current knowledge-based economy. These trends pose a competitive world in doing business for many firms in many countries. Companies are engaging a sustainable competitive approach and technology strategy to effectively manage their resources. The business environment is becoming more uncertain and unpredictable for both profit and non-profit organizations. Hence, managers and leaders of various firms must think, learn and act strategically (Almajali, Masadheh, & Tarhini, 2017). An evident approach with wide-range planning techniques like a strategic management process must be adopted in order to adapt environmental changes.

According to Almezi, Tarhini, and Sharma (2015), an organization’s strategy is a plan that is implemented to achieve the objectives by conducting operations, staking out a market position, competing successfully by attracting and satisfying customers in the marketplace. The central thrust of a company’s strategy is the undertaking of moves to build and strengthen its long-term competitive position and financial performance by gaining a competitive advantage over rivals by earning a company above-average profitability (Obeidat et al., 2017). Implementing an organization strategic plan is more important than its strategy (Balarezo & Nielsen, 2017). Strategy implementation is important because failure to actualize the strategy can render opportunities lost. Sadly, majority of the organizations that have strategic plans fail to implement them (Getz & Lee, 2011). It is noted through a review of published literature that many organizations do not succeed in implementing more than 70 per cent of their new strategic plans (Miller, Wilson, & Hickson, 2016), and 30 per cent fail to achieve anything at all. Further, nine out of ten organizations fail to implement their strategic plans for many reasons. Accordingly, the focus in the field of strategic management has now shifted from strategy formulation to strategy implementation.

According to Obeidat et al. (2016a, 2016b), lack of implementation creates problems in maintaining priorities and achieving organizational goals. Given these facts, a strategy implementation task is commonly the most complicated and time-consuming part of the strategic management process. A key cause of missing strategic goals is due to managers’ inability to invest the same amount of time, energy and resources in managing the implementation process of a strategy as they do in the formulation of the strategy. They also do not realize that managing strategy implementation activities requires well-orchestrated management processes and they need to go beyond the routine course of business processes to make it happen. To enhance the probability of successful strategy implementation, it is necessary to identify and analyze the most important and effective factors in strategy implementation in terms of relations and interactions among them. This study focuses on the operational factors that contribute to strategy implementation within the furniture manufacturing sector in Kenya. Most of the previous studies have focused on the first stage of a strategic decision-making process and there is insufficient literature concerning the implementation process of an organization’s strategy and only what analyzes the factors of a strategy implementation stage (Miller et al., 2016). Moreover, owing to these turbulent circumstances, the furniture manufacturing sector in Kenya has become increasingly competitive. The environment is very dynamic, uncertain and continuously changing. These circumstances have forced most small and medium firms to adopt more effective, unique and innovative strategies to maintain and improve their performance in order to gain a larger portion of the market share (Kenya Association of Manufacturers, 2018).

2. Theoretical Background

2.1. Theoretical Literature

The resource-based view was adopted for this study to explain the influence of managerial competencies on firm performance. The resource-based view of strategic management (RBV) theory was introduced by Penrose (1959) as being the inside-out perspective of a firm, as a “pool of resources” attributing to its competitive advantage. Later on, the theory was further developed by several researchers such as Grunt and Verona (2015). The resource-based view theory is based on two assumptions: first, the heterogeneous base of firms’ resources and internal capabilities, and second, their distinctiveness to encourage firms’ competitive advantage via resource immobility. The RBV theory points out that firms’ competitiveness even in the same industry varies based on firms’ resources and capabilities (Barney, Ketchen, & Wright, 2011; Barney et al., 2012). A firm’s strategic resources include tangible resources such as human, physical and financial components and intangible resources such as brand name, reputation, innovations and knowledge. For the wood products industry, in a case study of Finnish large and medium sawmills, the business success of case sawmills was strongly impacted by four intangible resources including personnel, collaboration, technological know-how, reputation and services and two tangible resources including raw materials and geographic location.

Resources in a firm can be either internal or external to the firm and may be acquired or already owned by the firm (Kush et al., 2014). The process through which a firm coordinates and deploys these resources will eventually affect its competitive advantage. Furthermore, as an extension of the resource-based-view theory, Teewe (2014) introduced a dynamic capability view to emphasize the necessity of resources to, firstly, adapt to business context and, secondly, adapt to dynamic environmental conditions in order to maintain a firm’s sustained competitive advantage. In other words, dynamic capabilities reflect firms’ adaptability responding to rapidly changing business environment.

According to Okumus (2003), leadership is crucial for using process factors and manipulating the internal environment to create a context receptive to change. The key issues considered here include the actual involvement of the CEO in the strategy formulation and implementation process, the level of support and backing from the CEO to the new strategy until it is completed, and the open and covert messages coming from the CEO about the
project and its importance. The third group includes organizational processes that incorporate operational planning. This is the process of initiating a project and operational planning of implementation activities and tasks. Issues dealt with include preparing and planning implementation activities, participation and feedback from different levels of management and functional areas in preparing operational plans and implementing activities, initial pilot projects and knowledge gained from them, and the time scale for making resources available and using them. The second key variable in an organizational process is resource allocation which ensures that all the necessary time, financial resources, skills and knowledge are made available.

H1: There is a positive relationship between managerial competencies and the performance of the furniture manufacturing firms in Kenya.

The research studies and articles focusing on the study of the relationship between managerial competencies and organizational performance are scarce. While the possession of a set of managerial competencies is touted as a precondition for economic growth and survival of business (Königová, Urbancová & Fejfar, 2012; Tahmasb, Nikdjas & Mirzuari, 2014).

H2: There is a moderating relationship between firm size and firm age and the performance of the furniture manufacturing firms in Kenya.

Vanpoucke et al. (2014) showed that firm size could influence the implementation of corporate environmental practices because larger companies have more resources to reduce environmental stress than smaller companies. Some scholars agreed that the age of a firm would likely determine the growth of the firm. They claimed that a critical level a company would go through would decrease over time, whereas the survival ability would increase along with the age of the firm. Unknown, newly established companies would be normally unable to achieve economies of scale and would have insufficient resources and managerial expertise while time and growth would make them more reliable in coping with such problems. However, previous empirical studies showed that the age of a firm did not provide conclusive evidence in relation to performance. Apart from the studies that analyze the moderating effect of age in different industries/countries simultaneously, there are also studies that are concentrated on one specific. A certain number of researchers also examined differences in firm performance (profitability and/or productivity) at different stages of age (Maja, 2017).

2.2. Empirical Literature

Competencies are a component of human capital and one of the most important assets of an enterprise. They play an important role in strengthening the position of a company in a competitive market. The development of competencies increases the organization’s ability to grow and compete through innovations (Szczepanska-Woszczyna, 2021). Every business organization needs effective managers to be successful in today’s highly competitive and dynamic business environment. It is very important for a business organization to identify, develop and retain talented people. Every successful and effective manager possesses several competencies that enable him to perform efficiently and effectively at different managerial levels. A competency is essentially a combination of knowledge, skills, behaviors and attitudes that contribute and what a person needs to be effective in a wide range of positions and various types of organizations (Anand, Sharma, & Colmnan, 2016).

Competencies of managers determine how a company is managed and also the human capital possessed and, therefore, the competencies of other employees are listed as internal factors that may directly or indirectly affect the activities of economic entities (Ahmad, Halim, & Zainul, 2010). The level of convergence of competencies possessed by managers with the competency needs of an organization arising from its specific character will determine the effectiveness of an implemented strategy.

According to Ogaj and Kimiti (2016), leadership is indicated by human capital, and ethical practices affect directly company’s performance demonstrated by the growth rate and return on sales, and that leadership also affects company’s performance indirectly through innovation. Danisman, Osuntos, and Karadag (2015) highlight that managerial capability has a medium-level effect on organizational performance. For successful strategy implementation, an optimally functioning competent management system needs to be put in place to ensure that the right decisions are made at the right time. According to Tripathi and Agrawal (2014), competency is a cluster of related knowledge, skills and behavior that are linked with effective organization’s performance. It can be measured, evaluated and enhanced by training, since employees are able to enhance their skills and ability by performing their jobs and putting them on the challenging tasks since performance and competencies are positively related.

Asumeng (2014), stated that skills and knowledge are behavioral attitudes that mostly predict success, and considered these behaviors are important for any organization thinking strategically and seeking prosperity. According to Königová, Urbancova, and Fejfar (2012), it is the input of persons’ (knowledge, abilities, skills, attitudes and values) measured by the analysis of outputs (real behavior and results), reflecting an organization level in the market and granting a competitive advantage and being considered as an important indicator of organization’s prosperity. A competency resides in individuals and teams with development as its general characteristic. However, since managerial competences are key ingredients in organizational success, they are already highly developed, which implies that minor competence development is unlikely to have any impact on them. Consequently, only major development of improvements is included.

According to Frederick, Kuratko, and O’Connor (2015), there is a tendency to categorize management competence into functional areas. Such categorization is supported by the intrinsic belief that businesses increase their chances of success when managers are competent in core functional areas such as strategy planning, marketing, finance, operations and human resource management. Thus, the survival and growth of a venture requires that an entrepreneur possesses strategy management competences and abilities and shift from an entrepreneurial to managerial style. In so doing, however, certain entrepreneurial characteristics must be retained in order to encourage creativity and innovation. Remaining entrepreneurial while making transition to some of the more managerial traits is vital for the successful growth of a new venture. According to Varlam et al. (2013), managing an enterprise may be the most critical tactic for its future success. Individuals with higher managerial abilities become successful managers and promote a firm growth while marginal managers close down their firms and become workers. After initiation of a new venture, an entrepreneur needs to develop an understanding of management changes. Accordingly, one of the primary ingredients in small business success must be the managerial competence of an owner-manager.

Successful strategy implementation depends on market imperfections and managerial decisions about the resources. A firm may achieve better rents not just because it has access to resources but because the core competencies of a firm better utilize these resources. In other words, the quality of management is an important driver of strategy implementation. The most important managerial competence is a strong, confident sense of “what to do” to achieve the desired results. Knowing what to do comes from understanding the circumstances of both an organization and an industry as a whole. This is not about “micromanaging” but about assigning tasks, making sure that people understand priorities, asking incisive questions, staffing and then following up with measurement.

The drivers of managerial competencies are leadership, employee development, decision-making, succession planning, governance and management systems. By taking into account and adjusting these six aspects, it is argued that management can implement a
strategy successfully. The aspects should support the implementation effort enabling a firm to learn from its implementation practice. Hence, the Kenyan furniture sector requires competent managers who are creative with the ability to negotiate and resolve conflicts, motivate employees and have knowledge of the industry with a long-term vision to implement effective changes in order to competitively grow the furniture manufacturing sector.

2.3. Firm Size and Firm Age

Firm level characteristics related to size and age were found to have a moderating effect on organization performance (Akinyomi & Olagunju, 2012; Papadogonas, 2007). Firm size is a variable that is widely acknowledged to influence firm performance (Hui et al., 2013; Yusuda, 2005). The causal relationship between firm size and performance yielded mixed results in a number of studies but found a positive relationship between firm size and profitability (Hall & Hasan, 2012). Loderer and Waelchli (2010) found that profitability declines as firms grow older, while firms get older, costs rise, growth slows, assets become obsolete and investment and R&D activities decline.

2.4. Firm Performance

The performance of a firm is measured by the degree of satisfaction on the levels of profitability and sales turnover. Growth for a business is essentially an expansion, making a company bigger, increasing its market and ultimately making it more profitable. Measuring the growth is possible by looking at some pertinent statistics, such as overall sales, number of staff, market share and turnover (Bylkova, 2015). Due to the sensitivity of obtaining information related to financial performance, the owners of a firm may not be willing to cooperate or information is unavailable. Performance is a major construct in management because almost every researcher or scholarly attempts to relate their constructs to business firm performance. Performance is also an economic outcome resulting from the interplay among organizational attributes, actions, and environment. Performance is mostly measured in financial terms (Barnat, 2012), and it encompasses three specific areas namely: (1) financial performance (profits, return on assets, and return on investment), (2) market performance (sales, market share) and (3) shareholder return (total shareholder return, economic value added).

3. Problem Statement

The Government of Kenya recognizes that the performance of the furniture sector is crucial both for the employment and economic growth in the country. Despite the government's initiatives on the development of the furniture manufacturing sector, poor performance is still reported. Rapid technological development has not been fully adopted in the furniture manufacturing sector in Kenya. The production declined sharply when timber supply from natural forests reduced due to the government's bans to sustainably manage the watersheds in mountain regions. Logging bans are still a major source of uncertainty with regard to input supply coupled with historically limited local demand. This has led to lower investment in upgrading technology, expanding manufacturing facilities and updating employee skills. Despite encouraging the market growth, firms have not invested in serial production facilities or developed necessary networks with other parts of a supply chain to enable them to produce en-mass. The firms are slowly being edged out of the market as cheap furniture imports from China, Malaysia and the United States of America continue to flood the market (Namale, 2012; KAM, 2017; World Bank 2013, 2014).

The research questions the study sought to answer are:

i. How do managerial competencies contribute to the performance of the furniture manufacturing firms in Kenya?

ii. How do firm age and firm size moderate the contribution of strategy implementation to the performance of the furniture manufacturing firms in Kenya?

4. Data and Method

The study was conducted in eight counties of the furniture manufacturing sector in Kenya targeting at senior-level management, departmental level management and operation-level management placed in strategic positions. The study used a descriptive and explanatory research design. Data was collected using quantitative and qualitative approaches. The research data required was on the two key constructs, namely strategy implementation and firm performance. The research instrument was administered through a drop and pick method. Managers were briefed on the nature of the research, and the instrument structure was measured using 22 items while firm performance was measured using 14 items. The research instrument was a 5-Point Likert scale that required respondents to indicate their opinions on the statements to the extent of the contribution of managerial competencies in strategy implementation to firm performance, and a total of 686 questionnaire were distributed and 572 were received showing a response rate of 83.3% (Hendra & Hill, 2018).

The population was stratified into four groups of a micro, small, medium and large firm size. Slinov's formula was used to each subgroup which ended up with 910 respondents and a sample size of 686 respondents from all the stratified groups was selected. A probability proportional to size (PPS) was used (Sekaran & Bougie, 2013). A simple random sample (SRS) of the groups was selected to obtain the 280 furniture manufacturing firms that participated in this study. The Yamane (1973) formula was applied in calculating the sample population (n) from the 314 licensed furniture manufacturing firms targeting at senior and departmental heads. So, the 280 firms were the sample population applicable in this formula since the rest of target population, i.e., micro, small, medium and large firms fell in categories of fewer than 10 people of the study. To factor in a non-response, the sample size was inflated by 10% leading to 309 furniture manufacturing firms. The 95% confidence level was selected because it is a standard confidence level widely used in business research (Zikmund, Babin, Carr, & Griffin, 2010). Based on the finite population of the 280 firms, the heads of departments were selected for the quantitative study, and at 5% level of confidence, the sample size was computed according to Slinov's formula:

\[ n = \frac{N}{1 + N \alpha^2} \]

where \( n \) stands for the total sample size, \( N \) stands for the total population, and \( \alpha = 0.05 \).

This sampling technique segmented the population into four strata in line with the sector as large firms (125), medium firms (83), small firms (329) and micro firms (49). The number of managers selected in each firm was proportional to the population of managers. A micro firm had one manager, a small firm had two managers, a medium firm had three managers and a large firm had four managers. The variables of managerial competencies, firm size and age and firm performance were measured by indicators on a Likert scale, with strongly disagree coded (1), disagree was coded (2), neutral (3), agree (4) and strongly agree was coded (5). Content validity and criterion related to validity were ascertained, and items of reliability were checked using Cronbach’s alpha coefficient (Cronbach’s, 1951). Factor analysis was used to identify latent factors that were inherent in the observed variables (Watkins, 2018). A principal component analysis was used to collapse a large number of items into fewer interpretable factors by extracting maximum variance. Similar items were combined to come up with constructs (sub-themes). The analysis of moments of structures was used to ascertain if the items in the survey lined up with the construct and to compare the measurement model with the
structural model in order to build up a theory. The assumptions of multicollinearity, multivariate normality with no outliers and heteroscedasticity were checked.

5. Result

The research data was summarized using frequencies and percentages to capture the biographic characteristics of the respondents while descriptive statistics were used to summarize the characteristics of the variables. From Table 1, the respondents were male, female and intersex. This implies that males dominate the furniture manufacturing sector in Kenya. The age of the respondents ranged from under 20 years to over 60 years old, and this implies that majority of the senior managers are between the ages of 30 and 40. The level of education indicates that majority are secondary and diploma certificate holders. Education levels affect management practices hence the higher the education level is attained by the managers, the more it is assumed that they can make better decisions to grow a business. Designated positions comprised senior-level management, middle-level management and operational-level management of a firm. The literature and real-life experience have it that it is the CEOs or their representatives who are the chief architects of strategies in organizations. This implies that data was collected from the right sources as presented in Tab. 1.

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>Categories</th>
<th>Frequency</th>
<th>Percentage, %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td>Males</td>
<td>465</td>
<td>81.29</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>90</td>
<td>15.73</td>
</tr>
<tr>
<td></td>
<td>Intersex</td>
<td>17</td>
<td>2.97</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>572</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Under 20 yrs</td>
<td>11</td>
<td>1.92</td>
</tr>
<tr>
<td></td>
<td>21-25 yrs</td>
<td>50</td>
<td>8.74</td>
</tr>
<tr>
<td></td>
<td>26-30 yrs</td>
<td>78</td>
<td>13.64</td>
</tr>
<tr>
<td></td>
<td>31-35 yrs</td>
<td>86</td>
<td>15.03</td>
</tr>
<tr>
<td></td>
<td>36-40 yrs</td>
<td>117</td>
<td>20.45</td>
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<tr>
<td></td>
<td>41-45 yrs</td>
<td>98</td>
<td>17.13</td>
</tr>
<tr>
<td></td>
<td>46-50 yrs</td>
<td>73</td>
<td>12.76</td>
</tr>
<tr>
<td></td>
<td>51-55 yrs</td>
<td>51</td>
<td>8.92</td>
</tr>
<tr>
<td></td>
<td>56-60 yrs</td>
<td>7</td>
<td>1.22</td>
</tr>
<tr>
<td></td>
<td>Over 60 yrs</td>
<td>1</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>572</td>
<td>100.00</td>
</tr>
<tr>
<td><strong>Highest level of education</strong></td>
<td>Post graduate</td>
<td>28</td>
<td>4.90</td>
</tr>
<tr>
<td></td>
<td>Undergraduate</td>
<td>86</td>
<td>15.03</td>
</tr>
<tr>
<td></td>
<td>Diploma</td>
<td>181</td>
<td>31.64</td>
</tr>
<tr>
<td></td>
<td>Secondary certificate</td>
<td>201</td>
<td>35.14</td>
</tr>
<tr>
<td></td>
<td>Primary certificate</td>
<td>76</td>
<td>13.29</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>572</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Designated positions</strong></td>
<td>Senior level management</td>
<td>213</td>
<td>37.24</td>
</tr>
<tr>
<td></td>
<td>Middle level management</td>
<td>202</td>
<td>35.31</td>
</tr>
<tr>
<td></td>
<td>Operational level management</td>
<td>157</td>
<td>27.44</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>572</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: developed by the author

Structural Equation Method (SEM) was used to answer the study objective of examining the contribution of managerial competencies to performance by extracting a relevant set of factors through factor analysis based on factor loadings. The extracted factors were then used to determine the reliability of the components of retained models for both the independent and dependent variables. The SEM model allowed having several diagnostic tests to ensure that the basic assumptions underlying the relevance of the data and the model used were not violated.

5.1. Individual Construct Reliability

From Tab. 2, the construct of managerial competencies was constituted using 22 items in a 5-point Likert scale. The reported reliability for these items was Cronbach’s alpha value of .786 which passed the threshold value of .7. The KMO test statistic reported a value of .786 (Chi-square 2702.325), and Bartlett’s test of Sphericity (df 210) had a p value of .000. The p-value was less than .05. The Test for size and age was estimated using 8 items and had a KMO value of .796 (Chi-square 980.155) and Bartlett’s test of Sphericity (df 78) and a p value .000. The cut-off value for tolerance is not less than .1 while for Variance Inflation Factor is not more than the value of 10 (Pullatt, 2020). Tolerance values for items of managerial competencies passed the cut-off (Min ,193, Max ,707) while for firm size and firm age (Min ,216, Max ,635) and firm performance tolerance values passed the test (Min ,216, Max ,846). Managerial competencies had a variance inflation factor score of minimum 1.415 and maximum 5.193, while firm size and firm age (Min ,574, Max 4.635), and firm performance had a score of minimum 1.182 and maximum of 4.635, all were within the acceptable range of values. A Likert scale used was and rated from 1-5 where: strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5).

After applying managerial competencies to Principal Component Analysis, six themes emerged. The managerial competencies had Eigenvalues of 4.527 and 1.109 and cumulative variance of 56% (Hair et al., 2021). Firm size and firm age had Eigenvalues of 3.006 and 1.169 and cumulative variance of 60%. Firm performance had Eigenvalues of 3.615 and 1.002 for the themes and cumulative variance of 56%. This implies that six indicators of managerial competencies accounted for 56% of variance while two indicators of firm size and firm age accounted for 60% of variance and four indicators of firm performance accounted for 56% of variance (Tab. 3).
5.2. Findings on Research Questions

The study carried out a number of operations to transform the data through the application of the Structural Equation Modeling (SEM) model that requires one to perform several procedures. This original data was screened to remove multivariate outliers by examining the Mahalanobis distances. 256 outliers were removed out of 686 cases and 430 remained cases were reasonable and within the acceptable range for a researcher to generalize the findings (Kline, 2011; Schumacher & Lomax, 2010; Zikmund et al., 2010). KMO and Bartlett's Test for the factor analysis of managerial competencies were carried out to reduce the items. The p-value was less than .05, and this result confirmed that the construct of managerial competencies could be factor analyzed (Bartlett, 1954; Kaiser, 1974; Field, & Miles, 2009).

**Factor Analysis Rotated Component Matrix for Managerial Competencies**

Based on a rotated component matrix, the six themes were selected for creating the index. Theme one of the statements of firm’s succession planning enhancing an employee job security had the highest factor loading of .842, while the statement of a firm has a policy framework to guide succession planning that had the lowest factor loading of .666. Other statements of the firm have a long-term vision guiding the succession implementation of a factor loading of .810, the firm formulated a strategic succession system of .707. Theme two “Employee development” deals with the firm’s statement encouraging the formation of competent management teams. This statement had the highest factor loading of .761, and the firm’s statement that the firm enhances commitment and ownership of decision making had the lowest factor loading of .649. Another statement is that the firm has a policy framework with a factor load of .713. Theme three “Decision-making” contains the statement of the board that supports socially responsible management practices of the firm had the highest factor loading of .676, and the statement of the firm that has a comprehensive human resource policy framework and procedures had the lowest factor loading of .656. Theme four “Succession planning” has only one statement of the firm that says that the firm has well-established levels of authority in business with a factor load of .535. Theme five of governance statement of the firm established plans and procedures and the statement that the firm has well-established levels of authority in business had a factor loading of .409. Theme six deals with the firm’s policies that the firm has a proficient management system to oversee the operations had a factor loading of .784.

**Factor Analysis Rotated Component Matrix for Firm Size and Age**

The study found that two themes could be used to create a summed score of size and age. Based on the rotated component matrix, the two themes selected for creating the index are: theme one “Size” contains the statement that the firm used economies of scale had the highest factor loading of .857, and the firm’s statement about a high sales growth was the lowest with a factor loading of .679. Another firm’s statement about more flexible and active search for market opportunities had a factor loading of .825.
Theme two ‘Age’ has the firm’s statement about benefits from experience and reputation. This statement had the highest factor loading of .776 while the statement of firm’s total assets, which had increased over the last five years, was the lowest with a factor loading of .658.

**Factor Analysis Rotated Component Matrix for Firm Performance**

The study found that four themes could be used to create a summated score of firm performance. Based on the rotated component matrix, the four themes extracted were: the statement that the quality of products had improved tremendously had the highest factor loading of .804 while the firm’s statement about a sufficient cash flow from operations had the lowest factor loading of .627. Other statements about firm’s capital investment that had an influence on the firm’s performance had a factor loading of .797, and the firm that had launched new products over the last five years had a factor loading of .626. Theme two deals with the firm’s statement about new customer acquisition, which had been on the rise, was the highest and had a factor loading of .694 while the firm’s statement about reduced defect rates was the lowest with a factor loading of .645. Theme three deals with the statement about market share that had been increasing had a factor loading of .721.

**Factor Analysis Rotated Component Matrix for Firm Performance**

![Factor Analysis Rotated Component Matrix for Firm Performance](image)

**Source:** developed by the author

### 6. Discussion

The managerial competencies construct consisted of leadership, employee development, decision making, succession planning and governance, and management systems to implement a strategy effectively to improve operations. The study found that the respondents ranked the highest leadership sub-construct with succession planning which enhances employee job security as the most important one of the leadership actions. With a long-term vision guiding succession implementation and formulation of a strategic succession system, a policy framework guides succession planning.

Succession planning involves preparing new leaders to take over organizations after leaders leave (Florea, Cheung, & Herndon, 2013). A national survey of 413 NPOs conducted by researchers at Nonprofit HR (2014) indicated that 33% were operating with a succession plan in place, while another 14% were at the implementation stage. The results from the study revealed that leaders of one in three organizations had identified their new leader through succession planning (Theus, 2012), and also found that the respondents ranked succession planning as the most important strategic leadership role.

Employee development is a managers’ key responsibility to ensure that employees have all the required skills and abilities to perform strategy implementation tasks by encouraging the formation of competent teams guided by a policy framework to enhance commitment and ownership of decision-making before, during and after a strategy implementation program. Chang, Cong & Shum, (2011) conducted a study of hotels and restaurants in China, researchers found that training customer-contact employees to possess multiple skills was significantly related to both incremental and radical innovation. If firms are to respond to the changes in their market and business environment, they will need to identify the type of staff and the skills they require in the future, and these may be different to those in the past (Meyer, 2005). This process is identified as an important and often over-looked function in many industries. It helps identify roles, individuals and competencies that are leaving (Bersin & Associates, 2007). The best-formulated strategies may fail to produce superior performance for a firm if they are not successfully implemented, Noble (2000). Effectiveness of strategy implementation is, at least

### 5.3. Model Fit Statistics

The study found that managerial competencies and firm performance had a positive and statistically significant contribution at .05 level of significance without being moderated by size and age of a firm. This was depicted by the significance of the standardized regression coefficient of a managerial competency hypothesis path ($\beta = 1.94$, S.E. 513, C.R. 3.781 and p-value <.05). Therefore, the alternative hypothesis that managerial competencies have a positive and statistically significant relationship between strategy implementation and firm performance was accepted at .05 level of significance while the hypothesis that firm size and firm age have a negative relationship between strategy implementation and firm performance was rejected. Therefore, a unit increase of managerial competencies leads to 1.94 increase in firm performance as presented in Fig. 1.

![Figure 1. Managerial competencies of a structural model contribute towards firm performance](image)
in part, affected by the quality of people involved in the process (Govindarajan & Trimble, 2012). Hrebiniak (2006) recognized the difficulty of strategy execution with such challenges as a lack of feelings of “ownership” of a strategy or execution plans among key employees. Here quality refers to the skills of people required by a specific task or position (Peng & Littlejohn, 2001). Heracleous (2000) found out that if middle management do not feel like they have the requisite skills to implement a strategy, then they are likely to sabotage its implementation.

The board of directors needs to support socially responsible management practices in line with a strategy implementation process. A study conducted by Dennis (2017) investigated social responsibility strategies in Brazil, and the findings were that consumers have positive attitudes and higher purchase intent from companies that demonstrate more socially responsible actions (Hwang & Kandampully, 2015; Öbderseder et al., 2015).

A comprehensive human resource policy framework provides an understanding of what is expected of each employee during the strategy implementation process. Managers require competencies to enable them to establish levels of authority in business to facilitate firm success, avoid conflict on organizational performance, and manage resistance to change. Alkalha et al. (2012) conducted a study of commercial banks in Jordan and the results showed that human resource policies are positively related to organizational performance and have a statistically strong significance of it; R square is (70.2%). It also concluded that the most important effect of a human resource policy on organizational performance is employees’ participation in decision making.

Departments have well-defined levels of authority for strategic decision-making to support a strategy implementation process. Eze et al. (2014) conducted a study in Nigeria of authority, power and conflict on organizational performance, and the findings revealed that there is a clear relationship among authority, power and conflict in organization and equally their impacts on workers’ performance and the productivity and growth of organizations. It is therefore clear that managers can predict what will happen to the productivity and growth of organizations as a result of workers’ performance through the exercise of authority and power in the overall management of an organization.

Establishing plans to respond to opportunities and threats in the external environment can enable a firm to create a competitive advantage in the sector. Kabiye (2019) investigated profit and non-profit organizations, and the study findings revealed that an effective strategic plan should be built on organizational strengths and take advantage of opportunities while overcoming or mitigating against the weaknesses and threats business faces. It should, however, be noted that having a strategic plan does not always guarantee success, but a well-crafted, innovative and creative plan that is well executed will guarantee success.

Communication and information systems are strategic assets which boost firm performance to a higher level, improves business processes and pilots changes in the function of the environment. Effective business management systems help to align a firm’s strategy and annual objectives with daily actions, monitor progress and prompt corrective actions. It guides and empowers managers and employees to drive process improvements every day.

The existence of a proficient management system to oversee operations supports a strategy implementation process and improves firm performance. Accordingly, organizations that exhibit a consistent strategic intention will allocate their resources effectively and engage in competitive activities that help achieve their objectives through the choices of IT systems and capabilities (Thompson et al., 2015). As the strategic role of IT increasingly shifts from supporting organizational practices to enabling bold organizational change (Nolan, 2012; Ward, 2012), understanding how and why IT becomes locally embedded in a particular way is a growing concern. This presents a strong case of the contribution of managerial competencies at the level of the board, CEOs and departmental managers to strategy implementation in the furniture manufacturing sector in Kenya extending the existing body of knowledge. Therefore, it can be inferred that managerial competencies in strategy implementation contributes to firm performance in the furniture manufacturing sector. The sub-themes extracted from firm size are economies of scale, flexibility in seeking market opportunities and high sales growth. Firm age is experience and reputation, increased assets, and they cannot moderate the contribution of strategy implementation to firm performance. This implies that all firms whether young or old, small, medium or large in size engage and participate in strategy implementation. Success of business initiatives cannot be pegged on age or size. Any firm can succeed in a strategy implementation process and achieve superior performance whether young or old, micro, small, medium or large so long as proper attention is given to innovation capability through leadership, employee development, decision making, succession planning and governance. The extracted firm performance sub-themes were improved product quality, capital investment influence on firm performance, new products launched by a firm and a sufficient cash flow from operations, rise in customer acquisition, a reduced defect rate, increased market share and satisfactory return on assets if the strategy implementation process is effectively managed by the furniture manufacturing firms by developing strong managerial competencies.

7. Conclusion

He study concludes that to enhance firm performance in the furniture manufacturing sector, CEOs and managers need to pay attention to leadership, employee development, decision-making, succession planning and governance when implementing a business strategy. To provide a clear direction of how the strategy implementation process can be improved to create a competitive advantage in the sector, managers must constantly monitor, evaluate and adjust their strategic initiatives. The study findings are solely based on the views of managers/owners and, therefore, the results are prone to managers’ bias. Thus, more studies should incorporate other stakeholders, namely consumers, suppliers and dealers to present more objectivity in findings, and since the study was only based on the furniture manufacturing firms in eight counties, generalizability of the findings could be limited to only the eight counties. Thus, more studies should be carried out to include other counties making the study more national.

8. Funding

This study received no specific financial support

9. Competing interests

The authors declare that they have no competing interests.

References


Determining Competitive Advantages of Insurance Companies in Ukraine

V. Volkova†, V. Oglih‡‡, A. Shapovalov‡‡‡, Y. Gurtovoy‡‡‡‡

Purpose: The study aims to analyze and determine the competitive advantages of insurance companies in Ukraine in order to increase their competitiveness on the basis of economic and mathematical modeling.

Approach / Findings: Detailed analysis of performance indicators of the leading insurance companies in Ukraine was carried out. Based on economic and mathematical modeling, their competitive advantages were calculated. Factors that most significantly affect the competitiveness of an insurance company were determined.

Originality / Value: The study includes a holistic and systematic approach to determining the competitive advantages of insurance companies in the Ukrainian market based on factor analysis of their performance. This study provides additional opportunities for strategic management of a company. The proposed approach can be the basis for implementing simulation experiments of an insurance company to determine the most significant indicators of its work to increase competitiveness.

Practical Implications: Model calculations, carried out in the work, made it possible to determine the position and opportunities of companies in the Ukrainian insurance market, factors that increase the competitiveness of insurance companies, as well as directions for improving their development strategies.

Research Limitations / Future Research: Research prospects are associated with further improvement of indicators that are system-forming in determining competitive advantages of insurance companies in Ukraine.

Paper type: Empirical

Keywords: insurance companies, competitive advantages, economic and mathematical modeling.

Reference to this paper should be made as follows:
Мета роботи: Аналіз та визначення конкурентних переваг страхових компаній України з метою підвищення їх конкурентоспроможності на засадах економіко-математичного моделювання.

Підходи/Результати дослідження: Здійснено докладний аналіз показників діяльності провідних страхових компаній України. На засадах економіко-математичного моделювання визначено їх конкурентні переваги. З’ясовано фактори, що найбільш суттєво впливають на конкурентоздатність страхової компанії.

Оригінальність/цінність дослідження: Дослідження включає цілісний системний підхід до визначення конкурентних переваг страхових компаній на ринку України на основі факторного аналізу показників їх функціонування. Це дослідження створює додаткові можливості для стратегічного управління компанією. Запропонований підхід може стати базою для здійснення імітаційних експериментів страхової компанії щодо визначення найбільш значущих показників її роботи для підвищення конкурентоздатності.

Практичне значення дослідження: Модельні розрахунки, проведені в роботі, дозволили визначити місце і можливості компаній на страховому ринку України, чинники підвищення конкурентоздатності страхових компаній, а також напрямки удосконалення стратегії їх розвитку.

Обмеження дослідження/Перспективи подальших досліджень: Перспективи досліджень пов’язані з подальшим удосконаленням показників, які є системоутворюючими при визначенні конкурентних переваг страхових компаній України.

Тип статті: Емпіричний

Ключові слова: страхові компанії, конкурентні переваги, економіко-математичне моделювання, багатомірний статистичний аналіз.
1. Introduction

In today’s world, insurance is a necessary element of protection of property and personal interests of citizens in any society. This is one of the conditions for successful functioning of economic systems of civilized countries and their sustainable economic development. Insurance as a component of the modern market of financial services significantly affects the state of the financial system of a country. It provides not only savings by setting up insurance funds, but also performs an important investment function, which involves investing temporarily free means of these funds in various types of assets. Thus, insurance serves as an important source of investment resources, a stimulator of economic growth, and also contributes to the stability of social reproduction in the economy (Embretch, Kluppelberg, & Mikosch, 2009; Botvina, 2020).

Therefore, a high level of development of an insurance market is necessary for successful functioning of the economy of any country. To achieve this, the state only needs to create legislative and tax conditions, the rest will be done by competition.

The Ukrainian insurance market is quite young and is only gradually forming. The population is not accustomed to insurance practices that operate successfully around the world. It is the norm for residents of Western Europe to have several insurance programs at the same time, including pension, medical, accident schemes, etc.

“Insurance has not fully implemented its function of real insurance protection and coverage of existing risks of economic entities yet” (Botvina, 2020). But insurance in Ukraine is slowly becoming an important element of socio-economic relations, which is able to ensure stability, confidence and security not only for ordinary citizens but also for business (Ruda, 2020).

Among the reasons for the underdevelopment of the insurance market in Ukraine are the following (Puri, 2018; Tereshtchenko, Karpushkina, & Klokova, 2019):

1) economic – low demand for insurance products, chronic lack of funds from individuals and businesses, distrust of insurance companies, much of the shadow economy;
2) legislative – the complexity of insurance legislation, partial inconsistency of various legislative acts, a high level of bureaucracy.

However, it should be noted that these causes are gradually being eliminated, the insurance market is growing and stabilizing. This is confirmed by the annual positive dynamics of the insurance services market in Ukraine. All this makes it attractive for doing business.

Insurance companies (IC) in the process of their creation and operation, like any other company, aim to maximize their profits and meet consumer demands in the market (VRU, 1996). There are several well-known ways to make more money – diversifying insurance services or reducing insurance costs.

Insurance activity is characterized by a fairly large number of indicators. Potential clients are interested in the most important indicators, on the basis of which they take the decision to obtain the service of an insurance company. However, in order to interest the policyholder and collect as many insurance premiums as possible, the insurer must have a unique quality and (or) value proposition. It can be its competitive advantage. This involves studying the consumer’s behavior and the factors that determine his/her choice about an insurance company.

On the other hand, competition in the insurance market is intensifying. In order for an insurance company to take its rightful place in a market, it is necessary to clearly identify the weaknesses and strengths of the company. It is also important to develop a system of indicators that will allow a clear comparison of competitors’ advantages and disadvantages.

The urgency of the problem of determining competitive advantages is associated with the dynamic development of an insurance market and significant competition in it. This market has its own specifics associated with a large number of insurance companies. Accordingly, each company has a small amount of insurance services (Ionin, 2018). Moreover, there is no single method of determining competitive advantages, bias and diversity of existing approaches to the ranking of insurance companies. The developed market of insurance services will inevitably become one of the factors of development of the national economy in Ukraine. Thus, the problem of determining the competitive advantages of an insurance company will become increasingly important and relevant.

2. Theoretical Background

Competitive advantage is the features of an insurance company, which are manifested in the possession of any exclusive values for the consumer. This provides it with preferences in the chosen field of expertise. Competitive advantages make the company recognizable in the market, protect from the influence of competitive forces, and give the opportunity to effectively use available resources.

A number of scientific works are devoted to the study of the concept of competitive advantages of companies and the development of appropriate models. Lambin (2012) determines the competitive advantage due to the presence of excellent characteristics of an enterprise, the special properties of its goods or services, which form certain privileges over competitors. But such an advantage can only be determined by comparing it with the characteristics of the most successful competitors in the market. The firm’s competitive advantage is thus relative and not always obvious.

According to the American economist Porter (1998), one of the most important factors of competitive advantages is a lower share of costs for running an insurance company and differentiation of insurance services. This approach orients the insurance company to the development, implementation and sale of insurance products at lower cost. As a result, the sale of insurance services at the same prices as competitors, allows the company to make more profits. Differentiation of insurance services also allows the company to earn high profits by raising prices.

To assess the level of competition in the insurance industry, an adapted model of competitive forces (the “five forces” model) by Porter (2004) is used. Such forces include: competition between existing insurance companies in the industry; insurance intermediaries; insurers; new insurers’ entering the market; insurance products-substitutes. The assessment of the degree of influence of each of the five forces of competition \( K_r \) in the insurance market is obtained on the basis of the method of expert assessments. Based on a weighted average score, the following conclusions are made: if the value obtained is \( K > 20 \), then the competition in the market is low. If the value is \( 20 < K < 40 \), then the competition in the market is average. If \( K > 40 \), then the competition in the market is high.

Most internal indicators of competitiveness are comparative in nature, which allows you to assess the competitiveness of an insurance company by comparing its performance with those of other insurance companies and evaluate its performance against the background of the entire insurance market or its individual segment (Rioja, 2021).

Another indicator of the company’s position in the insurance market is the so-called “MTIBU Traffic Light”. Four times a year, the Motor Transport Insurance Bureau of Ukraine evaluates the activities of insurance companies in Ukraine. This is due to the fact that among the main tasks of the MTIBU the analysis and generalization of information on compulsory civil liability insurance in order to develop proposals for improving this mechanism is declared. Following the results of each quarter, the MTIBU...
publishes an independent rating of insurance companies. The evaluation base for creating the specified rating is:

- general assessment of the company’s activity;
- quality of settlement of losses;
- number of complaints against an insurance company.

Rating results are displayed as color indicators. An excellent estimation corresponds to green, good – yellow, unsatisfactory – red. This rating is clear, quite clear. It allows you to compare the competitive advantages of companies, as well as analyze the dynamics of their work (Avtocivilka, 2020). But again, it is not entirely clear what indicators are used to calculate this rating and how they are consistent with each other.

Thus, the existing approaches to determining the competitive advantages of insurance companies are not without certain disadvantages, namely:

- are not clear enough about specific calculations;
- are based on a relatively small number of performance indicators of companies;
- the calculation of rating indicators is not always consistent with generally accepted estimates of financial and other performance indicators;
- often obtained indicators of competitive advantages are not independent and can be used mainly for comparison with other companies.

3. Purpose of the Study

The purpose of the study is analysis and determination of competitive advantages of insurance companies in Ukraine in order to increase their competitiveness on the basis of economic and mathematical modeling. To this end, the paper analyzes the existing approaches to determining the competitive advantages of an insurance company. The expediency of using the model of finding an integrated indicator of competitive advantages on the basis of indicators of reliability, quality, competitiveness, market characteristics, and social activity is substantiated.

Relevant calculations and a comparative analysis of the obtained results are performed. The strengths and weaknesses of insurance companies, their place in the Ukrainian insurance market are studied.

4. Data and Method

The paper presents a study of the Ukrainian insurance market for the period from the 1st quarter of 2020 to the 2nd quarter of 2021. This period was chosen on the grounds that Ukraine is in a state of bifurcation due to qualitative changes caused by changes in the quantitative parameters of the economy (reforms, Covid-19, etc.). The information base for calculations was formed on the basis of data of the Ministry of Finance of Ukraine, the National Bank of Ukraine, financial statements of insurance companies and other public information. As a result, a sample of 19 insurance companies was created, the information about which is presented most fully. To perform calculations, software was created in Excel, and the SPSS package was used.

The development of the insurance market is closely related to the dynamics of indicators that characterize the interaction of insurers, policyholders, reinsurers and other market participants. Such indicators include gross insurance premiums and gross insurance payments, which determine insurance reserves and form the insurer’s gross profit. Depending on the financial result, the insurer increases or decreases the amount of its assets after paying all taxes. However, the values of these indicators depend on the number of contracts and the price of an insurance product. Indicators of insurance statistics of Ukraine in 2020-2021 are presented in Tab. 1.

Table 1: Dynamics of indicators of insurance statistics of Ukraine in 2020-2021

<table>
<thead>
<tr>
<th>Period</th>
<th>The level of gross payments, %</th>
<th>The level of net payments, %</th>
<th>Gross profit, UAH millions</th>
<th>Net profit, UAH millions</th>
<th>Share of insurance premiums provided to reinsurers, %</th>
<th>The cost of an insurance contract, UAH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 quarter 2020</td>
<td>32.47%</td>
<td>37.85%</td>
<td>7,798.9</td>
<td>6,009.0</td>
<td>16.29%</td>
<td>284.94</td>
</tr>
<tr>
<td>2 quarter 2020</td>
<td>34.79%</td>
<td>35.30%</td>
<td>6,175.5</td>
<td>5,854.1</td>
<td>4.44%</td>
<td>545.19</td>
</tr>
<tr>
<td>3 quarter 2020</td>
<td>34.21%</td>
<td>37.56%</td>
<td>7,860.8</td>
<td>6,590.9</td>
<td>11.66%</td>
<td>378.91</td>
</tr>
<tr>
<td>4 quarter 2020</td>
<td>30.45%</td>
<td>32.80%</td>
<td>8,497.1</td>
<td>7,444.3</td>
<td>9.33%</td>
<td>392.33</td>
</tr>
<tr>
<td>1 quarter 2021</td>
<td>36.36%</td>
<td>38.68%</td>
<td>7,664.1</td>
<td>6,818.5</td>
<td>7.66%</td>
<td>411.72</td>
</tr>
<tr>
<td>2 quarter 2021</td>
<td>34.63%</td>
<td>36.25%</td>
<td>8,214.8</td>
<td>7,506.1</td>
<td>6.30%</td>
<td>459.83</td>
</tr>
</tbody>
</table>

Source: completed by the authors according to Ukrainian insurance market statistics (Forinsurer™, 2021b).

In the 4th quarter of 2020, insurers were able to recover the value of their assets after their decline in the crisis quarter of 2020, caused by coronavirus and lockdown. Gross insurance premiums in the 2nd quarter decreased by 18% compared to the 1st quarter for the same reason. However, by the end of the year, they gradually grew and in the 1st quarter of 2021 exceeded the corresponding figure before the pandemic.

It should be noted that in the crisis of the 2nd quarter, the number of concluded insurance contracts decreased more than twice: from 40,530.8 to 17,369.1 thousand contracts, the decrease was 57.15%. At the same time, the decrease in insurance premiums was only 18%, that is why on the chart this fluctuation is not so significant. This was due to an increase in the average cost of 1 insurance contract from UAH 284.94 up to UAH 545.19 in the crisis quarter. In turn, the price increase could be due to an increase in the insurance rate and increased risk due to the uncertainty of further socioeconomic life of the country. During the study period (1st quarter 2020—2nd quarter 2021), the ratio of gross payments to insurance premiums remained virtually unchanged and amounted to about 35%.

In turn, the share of insurance premiums provided to reinsurers decreased from 11.66% in the 3rd quarter of 2020 to 7.66% in the 1st quarter of 2021. Obviously, this share will continue to decline because when the functioning of the economy stabilizes, the accepted risk does not need to be redistributed. The insurer fully relies on its own insurance reserves to pay compensation in the event of an insured event. On the other hand, the share of insurance premiums provided to reinsurers creates the basis for the reliability of an insurance company in the eyes of customers. This is also worth remembering. The dynamics of the insurance market development in Ukraine in 2020-2021 is presented in Fig.1.
An important indicator of insurance market development is the indicator of “insurance penetration”. This is a relative indicator that compares gross insurance premiums and gross domestic product (GDP) and assesses the impact of insurance on the socioeconomic development of the country. In 2020, GDP in actual prices amounted to UAH 4,194,102 million, the “penetration rate” was 1.08%. The threshold value should be in the range from 1% of a critical level to 8% of an optimal level (VRU, 2013). Therefore, it is a signal for further development of the insurance market, diversification of insurance services, increasing their uniqueness and attracting more people to different types of insurance.

To analyze and determine the competitive advantages of insurance companies, the study is based on the model proposed by Klepikova (2013), with some additions and some changes. We introduce the concept of an integrated indicator of competitive advantages of an insurance company, which is the sum of five groups of indicators: reliability of an insurance company, quality of services, competitiveness, market position in insurance services, and social activity. Each of these groups of indicators characterizes a certain aspect of an insurance company and requires calculations of primary indicators.

The integrated indicator (IP) of competitive advantages of the insurance company can be represented as follows (Klepikova, 2013):

$$\text{IP} = \text{NIC} \times \delta_1 + Q \times \delta_2 + \text{COM} \times \delta_3 + \text{IM} \times \delta_4 + \text{SP} \times \delta_5,$$

(1)

Nic – reliability IC,

Q – quality of services,

COM – competitiveness,

IM – market position in insurance services,

SP – social activity IC,

$\delta_1, \delta_2, \delta_3, \delta_4, \delta_5$ – coefficients of relative importance of each indicator.

The reliability of an insurance company (NIC) is expressed by the sum of indicators of financial stability, the average value of insurance payments, the level of reinsurance, weighted by the coefficients of their importance (Klepikova, 2013).

Financial stability can be seen as the ability of a market entity to maintain its financial resources when changing the state and requirements of the environment. The financial stability of an insurance company is formed from solvency, the probability of bankruptcy and capitalization (Klepikova, 2013).

Solvency is the ability of a company to pay its debts. This indicator is found by comparing equity with the sum of short-term and long-term liabilities of the IC. The higher this figure is, the better the company’s debts can be covered by its own funds.

An important indicator is the probability of bankruptcy of an insurance company. In Ukrainian practice, in order to identify trends in the formation of an unsatisfactory balance sheet structure in a profitable business entity, rapid diagnosis of bankruptcy is carried out using the Beaver coefficient:

$$\text{KB} = 1 - \frac{\text{NP} + \text{A}}{\text{C} + \text{L}}.$$

(2)

KB – the probability of bankruptcy,

NP – gross profit,

A – amortization,

C – short-term liabilities,

L – long-term liabilities.

If the Beaver ratio is more than .40, then the probability of bankruptcy can be considered zero, if the ratio is between .17 and .40, there is probable bankruptcy in the next 5 years, and if it is less than .17, then bankruptcy happens within a year.

The capitalization of an insurance company is calculated as follows: if the company does not comply with the requirements of the Law of Ukraine “On Insurance” regarding the creation of a statutory...
fund, the indicator is assigned to 0; if it has a statutory fund that clearly complies with the law, the indicator is equal to .10; if the statutory fund is 10-20% more than the norm – .20; if 21-50% more – .40; if 51-70% more – .50, if 71% and more – 1 (Vasylenko, 2021).

The next indicator of the reliability of an insurance company is reinsurance. Reinsurance aims to reduce the risk of losses in an unstable environment and emergencies. It allows you to compensate for fluctuations and reduce potential damage. In fact, it is a mechanism for sharing responsibilities between insurers to ensure the financial stability of the IC. The level of reinsurance shows which part of the risks assumed by the insurance company transferred to third parties. It is calculated as the ratio of the amount of payments transferred to reinsurers to the total amount of insurance payments.

The quality of services of an insurance company (Q) is an important group of indicators as part of an integrated indicator of competitive advantages. Quality assessment is always quite subjective and is manifested through the interaction of an insurer and a client. The quality of services consists of a weighted sum of the following indicators: the structure of an insurance portfolio, the presence or absence of designer programs, service, and discount systems (Klepikova, 2013).

Every company strives to form an efficient and balanced insurance portfolio. The indicator of the structure of an insurance portfolio is calculated as the sum of two indicators:

- the first indicator is equal to .50 if, in the structure of the insurance portfolio, liability insurance and compulsory types of insurance are more than 50%; if less, it is equal to a corresponding ratio;
- the second indicator is equal to .50 if property insurance and optional types of insurance are more than 40%; if less, it is equal to a corresponding ratio.

The availability of designer programs is calculated binomially: 1 – if there is a program, 0 – if there is no program. Discount system: 1 – if there are discounts, 0 – if there are no discounts. Level of service: 1 – if there is a 24-hour support phone and mail, 0 – if there is no 24-hour support or mail.

An integrated competitive advantage indicator (COM) contains a group of indicators that determines the ability of an insurance company to defend its position in the market. It includes rating of the insurance company, pricing policy, the share of legal entities in insurance premiums, office and agency network.

The customer always makes a choice. In the case of insurance companies, we deal with serious and often long-term cooperation. Therefore, when reviewing potential partners in information space, the first aspect of comparing insurance companies is ratings. The most popular and common are the ratings that are calculated as the sum of insurance company’s assets or as the level of payments made by the insurance company.

A price policy indicator is presented as the average cost of one insurance contract. The share of legal entities in the client base of the insurance company also indicates the vector of development chosen by the insurance company. We calculate the indicator as the ratio of the amount of payments by legal entities to the total amount of payments.

The indicator of office and agency network testifies both to stability of work, and to convenience for clients. It is calculated as the number of regions in which the IC is represented divided by the total number of regions.

The company’s position in the insurance services market (IM), as part of an integrated indicator of competitive advantages, is determined by the presence of licenses, the share of foreign companies, and the duration of its existence. Timely renewal of old and obtaining new licenses for specific types of insurance services, such as sea freight insurance, can improve the position of the insurance company and expand its customer base. The indicator of license availability is calculated by dividing the number of licenses held by the insurance company by the maximum number of licensed types of insurance services in the country.

Similarly, we can calculate the life of an insurance company, which also indicates stability. It means that the lifespan of the insurance company is divided by the lifespan of the insurance company in Ukraine.

The choice of an insurance company may be influenced by the proportion of shares owned by non-residents, as confidence in companies with foreign capital is significantly higher than in domestic ones. The share of foreign companies is calculated according to the following scheme: if the company has no foreign investment, it is 0; if the share of foreign investment is less than 50%, it is .50; if it is 50% or more, the corresponding ratio is indicated.

The activity of insurance policy on the Internet can be a decisive factor in choosing an insurance company. The indicator of social activity (SP) consists of four components, namely the number of Facebook subscribers, mentions of the company on social networks, search queries about the company, and mentions in the media.

The information base for calculations is formed on the basis of data provided by the Ministry of Finance of Ukraine, the National Bank of Ukraine for 2020-2021, financial statements of insurance companies and other public information. As a result, a sample of 19 insurance companies was created, the information about which is presented most fully.

5. Results and Discussions

In accordance with the above model of finding an integrated indicator of competitive advantages of an insurance company, the calculations of this indicator were carried out.

Indicators of reliability of insurance companies in Ukraine in 2020 and its components are given in Tab. 2.

As the indicator of financial stability consists of a number of indicators, the results of their calculations are given in Tab. 3. VUSO insurance company has the highest solvency as its equity stake exceeds the sum of short-term and long-term liabilities. The probability of bankruptcy of all insurance companies can be considered zero, except for Oranta due to the relatively average financial result and the largest amount of depreciation deductions – UAH 1,335 billion. According to Beaver’s bankruptcy rate, the company could go bankrupt within a year.

Analyzing the list of companies, ‘PZU Ukraine’, ‘CI USI’, ‘Colonnade Ukraine’, ‘Krayina’ do not meet the norm of authorized capital of €1m for insurance companies engaged in risky types of insurance. The most stable companies are ‘Ingo’, ‘ARX’ and ‘ASKA’.

According to the results of calculations, the most reliable companies are ‘ASKA’ and ‘Ingo’. ARX has a reinsurance level of 6%, it assumes 94% of all risks, which can be dangerous if there are any fluctuations in the insurance market. On the other hand, its financial result in 2020 was the largest among the companies and amounted to UAH 298,658,000. It means that reinsurance is not required for this company. Thus, the indicator of a reinsurance level should be compared with the financial result.

To obtain the final values of insurance companies’ quality rating, it is necessary to perform preliminary calculations. Thus, the structure indicators of the IC insurance portfolio and its components are given in Tab. 4.

The balance of the insurance portfolio provides a share of at least 50% for compulsory types of insurance and at least 40% for voluntary types of insurance. If one of the conditions is met, the indicator of 0.5 is set; if both conditions are met, the indicator is 1; if there are other cases, there will be specific shares. Thus, ‘Insurance company UPSK’, ‘Kniazha VIG’, ‘Oranta’ and ‘Eurosins Ukraine’ have balanced insurance portfolios.
Table 2: Indicators of reliability of insurance companies in Ukraine

<table>
<thead>
<tr>
<th>Company name</th>
<th>Financial stability</th>
<th>The level of insurance payments</th>
<th>Level of reinsurance</th>
<th>Reliability of insurance companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  ASKA</td>
<td>.27</td>
<td>.24</td>
<td>.67</td>
<td>3.18</td>
</tr>
<tr>
<td>2  Ingo</td>
<td>.38</td>
<td>.47</td>
<td>.19</td>
<td>3.04</td>
</tr>
<tr>
<td>3  Ukrainian insurance group</td>
<td>.12</td>
<td>.48</td>
<td>.27</td>
<td>2.87</td>
</tr>
<tr>
<td>4  Uniqa</td>
<td>.24</td>
<td>.49</td>
<td>.13</td>
<td>2.86</td>
</tr>
<tr>
<td>5  Kniazha VIG</td>
<td>.17</td>
<td>.39</td>
<td>.27</td>
<td>2.83</td>
</tr>
<tr>
<td>6  Arsenal Insurance</td>
<td>.25</td>
<td>.36</td>
<td>.18</td>
<td>2.78</td>
</tr>
<tr>
<td>7  Universalna</td>
<td>.30</td>
<td>.31</td>
<td>.15</td>
<td>2.76</td>
</tr>
<tr>
<td>8  European Insurance Alliance</td>
<td>.05</td>
<td>.28</td>
<td>.41</td>
<td>2.74</td>
</tr>
<tr>
<td>9  ARX</td>
<td>.27</td>
<td>.38</td>
<td>.06</td>
<td>2.70</td>
</tr>
<tr>
<td>10 VUSO</td>
<td>.12</td>
<td>.34</td>
<td>.18</td>
<td>2.64</td>
</tr>
<tr>
<td>11 CI USI</td>
<td>.87</td>
<td>.40</td>
<td>.14</td>
<td>2.41</td>
</tr>
<tr>
<td>12 PZU Ukraine</td>
<td>.30</td>
<td>.61</td>
<td>.46</td>
<td>2.36</td>
</tr>
<tr>
<td>13 Alpha Strahovanie</td>
<td>.03</td>
<td>.27</td>
<td>.02</td>
<td>2.32</td>
</tr>
<tr>
<td>14 Krayina</td>
<td>.78</td>
<td>.49</td>
<td>.02</td>
<td>2.30</td>
</tr>
<tr>
<td>15 IG TAS</td>
<td>.77</td>
<td>.44</td>
<td>.06</td>
<td>2.27</td>
</tr>
<tr>
<td>16 Euroins Ukraine</td>
<td>.67</td>
<td>.32</td>
<td>.23</td>
<td>2.22</td>
</tr>
<tr>
<td>17 Insurance company UPSK</td>
<td>.63</td>
<td>.39</td>
<td>.01</td>
<td>2.03</td>
</tr>
<tr>
<td>18 Oranta</td>
<td>.45</td>
<td>.40</td>
<td>.05</td>
<td>1.91</td>
</tr>
<tr>
<td>19 Colonnade Ukraine</td>
<td>.50</td>
<td>.31</td>
<td>.09</td>
<td>1.89</td>
</tr>
</tbody>
</table>

Source: completed by the authors according to the ratings of insurance companies in Ukraine (2021)

Table 3: Indicators of financial stability of insurance companies in Ukraine

<table>
<thead>
<tr>
<th>Company name</th>
<th>Solvency</th>
<th>Probability of non-bankruptcy</th>
<th>Capitalization</th>
<th>Financial stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  Ingo</td>
<td>.49</td>
<td>.89</td>
<td>1</td>
<td>2.38</td>
</tr>
<tr>
<td>2  Universalna</td>
<td>.46</td>
<td>.84</td>
<td>1</td>
<td>2.30</td>
</tr>
<tr>
<td>3  ARX</td>
<td>.46</td>
<td>.81</td>
<td>1</td>
<td>2.27</td>
</tr>
<tr>
<td>4  ASKA</td>
<td>.40</td>
<td>.87</td>
<td>1</td>
<td>2.27</td>
</tr>
<tr>
<td>5  Arsenal Insurance</td>
<td>.29</td>
<td>.96</td>
<td>1</td>
<td>2.25</td>
</tr>
<tr>
<td>6  Uniqa</td>
<td>.43</td>
<td>.82</td>
<td>1</td>
<td>2.24</td>
</tr>
<tr>
<td>7  Kniazha VIG</td>
<td>.29</td>
<td>.88</td>
<td>1</td>
<td>2.17</td>
</tr>
<tr>
<td>8  Ukrainian insurance group</td>
<td>.15</td>
<td>.97</td>
<td>1</td>
<td>2.12</td>
</tr>
<tr>
<td>9  VUSO</td>
<td>.13</td>
<td>.50</td>
<td>.50</td>
<td>2.12</td>
</tr>
<tr>
<td>10 European Insurance Alliance</td>
<td>.72</td>
<td>.93</td>
<td>.40</td>
<td>2.05</td>
</tr>
<tr>
<td>11 Alpha Strahovanie</td>
<td>.67</td>
<td>.86</td>
<td>.50</td>
<td>2.03</td>
</tr>
<tr>
<td>12 CI USI</td>
<td>.89</td>
<td>.99</td>
<td>0</td>
<td>1.87</td>
</tr>
<tr>
<td>13 Krayina</td>
<td>.92</td>
<td>.86</td>
<td>0</td>
<td>1.78</td>
</tr>
<tr>
<td>14 IG TAS</td>
<td>.40</td>
<td>.88</td>
<td>.50</td>
<td>1.77</td>
</tr>
<tr>
<td>15 Euroins Ukraine</td>
<td>.43</td>
<td>.74</td>
<td>.50</td>
<td>1.67</td>
</tr>
<tr>
<td>16 Insurance company UPSK</td>
<td>.45</td>
<td>.68</td>
<td>.50</td>
<td>1.63</td>
</tr>
<tr>
<td>17 Colonnade Ukraine</td>
<td>.73</td>
<td>.77</td>
<td>0</td>
<td>1.50</td>
</tr>
<tr>
<td>18 Oranta</td>
<td>.45</td>
<td>.00</td>
<td>1</td>
<td>1.45</td>
</tr>
<tr>
<td>19 PZU Ukraine</td>
<td>.42</td>
<td>.88</td>
<td>0</td>
<td>1.30</td>
</tr>
</tbody>
</table>

Source: completed by the authors according to the ratings of insurance companies in Ukraine (2021)

Quality indicators of insurance companies with their components are given in Tab. 5. Leaders among the insurance companies in terms of quality rating are ‘IG TAS’, ‘VUSO’, ‘Ukrainian insurance group’, and ‘ARX’ mainly due to the fact that all requirements of analysis are met. All companies have the appropriate customer service. It may be necessary to improve this indicator by having, for example, chat bots that can communicate and answer questions instead of support service.

Programs that allow you to determine the cost of insurance policies online are also not a very significant competitive advantage, and their absence is rather a deviation from the normal pattern. The insurance company ‘Ingo’ cannot provide the cost of the policy without an application via e-mail. In ‘CI USI’, the cost of the policy cannot be calculated due to the temporary suspension of operating licenses. ‘Colonnade Ukraine’ calculates the cost of the policy only by car plates, it is impossible to perform according to the parameters of a car.
Table 4: Calculation of the structure of the insurance portfolio

<table>
<thead>
<tr>
<th>Company name</th>
<th>Share of compulsory types of insurance</th>
<th>Share of voluntary types of insurance</th>
<th>Structure Indicator of the insurance portfolio</th>
</tr>
</thead>
<tbody>
<tr>
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Source: completed by the authors according to the ratings of insurance companies in Ukraine (2021)

Table 5: Indicators of service quality of insurance companies in Ukraine

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<th>Company name</th>
<th>The structure of the insurance portfolio</th>
<th>Designer programs</th>
<th>Level of service</th>
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</tbody>
</table>

Source: completed by the authors according to the ratings of insurance companies in Ukraine (2021)

However, the system of discounts and promotions is a significant competitive advantage. In particular, the company ARX offers discounts when applying for a policy online for 7 minutes, a 10% discount for installing the Smart Drive application. Discounts up to 25% are provided for the following driving indicators: do not exceed the speed limit and do not use the phone while driving, which are recorded by the Smart Drive application. ‘Ingo’ offers a 5% discount on passing the test, other insurers have only promotional offers.

The results of calculations of competitiveness indicators of insurance companies in Ukraine are presented in Tab. 6.

In terms of competitiveness, the leader is ‘ARX’, which has one of the largest assets and premiums collected. According to the number of compliance points specified in the Comprehensive Information System of the National Bank of Ukraine, it ranks second within 179 NBU points (2021). Oranta Insurance Company has the largest number of compliance points — 800, which allows the company to be in the top three.

The position of companies in the insurance market and the components of this indicator are given in Tab. 7.
Table 6: Competitiveness indicators of insurance companies in Ukraine

<table>
<thead>
<tr>
<th>Company name</th>
<th>Ranking among 50 companies</th>
<th>Pricing policy</th>
<th>Share of legal entities</th>
<th>Office network</th>
<th>Competitiveness</th>
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Source: completed by the authors according to Forinsurer™ (2021a), NBU (2021a)

Table 7: Characteristics of insurance companies in the Ukraine’s insurance market in 2020

<table>
<thead>
<tr>
<th>Company name</th>
<th>Availability of licenses</th>
<th>Proportion of shares of foreign companies</th>
<th>Lifespan of companies</th>
<th>Position in the insurance market</th>
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</table>

Source: completed by the authors according to Minfin (2021)

The largest number of licenses 60 was lost by the insurance company UPSK in 2020. The insurance company USI was temporarily deprived of licenses on April 20, 2021. Therefore, today it performs its duties only under previously concluded contracts in full (NBU, 2021b).

Among the 19 companies, only 7 do not have shares owned by foreign companies, so for them the corresponding figure is 0.

Nowadays, the indicator that characterizes the lifespan of companies somewhat has lost its relevance. After all, with the advent of the concept of startup projects, it is necessary to assess the lifespan of companies in combination with the market share that companies have managed to win over this period.

Social activity of insurance companies with relevant components is given in Tab. 8. The most socially active insurance companies are ‘ARX’, ‘Arsenal Strahovanie’, ‘Alpha insurance’ since they have their own pages on Facebook, Twitter, Telegram, Viber, Instagram,
YouTube, and Tiktok. That is why ‘ARX’ has record insurance premiums and pays attention to the number of solvent subscribers on Facebook and increases its presence in other social networks.

The obtained results of the integrated indicator of competitive advantages of insurance companies in Ukraine are given in Tab. 9. The table also contains the values of five groups of indicators, the weighted sum of which forms an integrated indicator. They are the reliability of an IC, the quality of services, competitiveness, the market position in the insurance market, and social activity. The coefficients of importance in the above calculations are equal to 1. However, if necessary, their value can be changed using the method of expert assessments.

Table 8: Indicators of social activity of insurance companies in Ukraine in 2020

<table>
<thead>
<tr>
<th>Company name</th>
<th>Facebook</th>
<th>Social networks</th>
<th>Google search queries</th>
<th>Mentioned in the media</th>
<th>Social activity</th>
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Source: completed by the authors based on social media data

Table 9: An integrated indicator of competitive advantages of Ukrainian insurance companies in 2020

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<th>Company name</th>
<th>Reliability of Insurance Company</th>
<th>Quality of services</th>
<th>Competitiveness</th>
<th>Position in the insurance market</th>
<th>Social activity</th>
<th>An integrated indicator of competitive advantages</th>
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<td>2.89</td>
<td>1.54</td>
<td>2.26</td>
<td>0.52</td>
<td>10.05</td>
</tr>
<tr>
<td>11 ASKA</td>
<td>3.18</td>
<td>2.52</td>
<td>2.00</td>
<td>1.68</td>
<td>0.36</td>
<td>9.74</td>
</tr>
<tr>
<td>12 Oranta</td>
<td>1.91</td>
<td>2.79</td>
<td>2.42</td>
<td>2.17</td>
<td>0.38</td>
<td>9.68</td>
</tr>
<tr>
<td>13 Universalna</td>
<td>2.76</td>
<td>2.72</td>
<td>1.88</td>
<td>1.50</td>
<td>0.55</td>
<td>9.42</td>
</tr>
<tr>
<td>14 Euroins Ukraine</td>
<td>2.22</td>
<td>2.86</td>
<td>1.19</td>
<td>2.31</td>
<td>0.62</td>
<td>9.20</td>
</tr>
<tr>
<td>15 Insurance company UPSK</td>
<td>2.03</td>
<td>2.90</td>
<td>1.43</td>
<td>1.94</td>
<td>0.79</td>
<td>9.08</td>
</tr>
<tr>
<td>16 European Insurance Alliance</td>
<td>2.74</td>
<td>2.50</td>
<td>1.13</td>
<td>1.95</td>
<td>0.56</td>
<td>8.89</td>
</tr>
<tr>
<td>17 Colonnade Ukraine</td>
<td>1.89</td>
<td>1.50</td>
<td>1.38</td>
<td>2.14</td>
<td>0.53</td>
<td>7.45</td>
</tr>
<tr>
<td>18 Krayina</td>
<td>2.30</td>
<td>2.72</td>
<td>1.14</td>
<td>1.12</td>
<td>0.03</td>
<td>7.31</td>
</tr>
<tr>
<td>19 CI USI</td>
<td>2.41</td>
<td>1.72</td>
<td>1.08</td>
<td>0.55</td>
<td>0.44</td>
<td>6.20</td>
</tr>
</tbody>
</table>

Source: completed by the authors based on Tab. 2, 5-8.
Thus, the insurance company ARX has the greatest competitive advantages. Its competitive advantages include compliance of the authorized capital with legal norms; availability of a well-thought-out system of discounts; balanced pricing policy (according to the results of 2020, the company collected the largest number of insurance premiums); developed office network; presence in all possible social networks; the largest number of followers on Facebook. And although ‘ARX’ was the leader in only 2 of the 5 blocks of the analysis, it was confident in the top five.

The group of leaders in the insurance market also included 8 more companies, which took places from 2 to 9 (Tab. 9). It should be emphasized that ‘ARX’, ‘IG TAS’, ‘Unïqua’, ‘Ingo’, which took the first four positions, have high values of reliability and quality of insurance services.

Analyzing the competitive advantages of the companies, we can say that the key to success is customer focus. It is not only about attracting new customers, but also retaining existing ones. An example is the experience of the insurer ARX in introducing a whole system of discounts to encourage the renewal of contracts.

In general, the key to gaining a competitive advantage by any company is stable development in all areas of expertise simultaneously.

For comparison, the rating of insurance companies by value of assets and collected insurance premiums was also calculated (Tab. 10). This table illustrates that the ratings of the IC on competitive advantages and insurance premiums are quite close.

**Table 10: Comparison of ratings of insurance companies in Ukraine**

<table>
<thead>
<tr>
<th>Company name</th>
<th>Competitive advantage rating</th>
<th>Asset rating</th>
<th>Insurance premium rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARX</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>IG TAS</td>
<td>2</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Unïqua</td>
<td>3</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Ingo</td>
<td>4</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Arsenal Strahovanie</td>
<td>5</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Ukrainian insurance group</td>
<td>6</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>PZU Ukraine</td>
<td>7</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Alpha insurance</td>
<td>8</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>VUSO</td>
<td>9</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>Kняжча VIG</td>
<td>10</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>ASKA</td>
<td>11</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>Oranta</td>
<td>12</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Universalina</td>
<td>13</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Euroins Ukraine</td>
<td>14</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Insurance company UPSK</td>
<td>15</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>European Insurance Alliance</td>
<td>16</td>
<td>19</td>
<td>18</td>
</tr>
<tr>
<td>Colonnade Ukraine</td>
<td>17</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>Krayina</td>
<td>18</td>
<td>18</td>
<td>15</td>
</tr>
<tr>
<td>CI USI</td>
<td>19</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

**Source:** completed and calculated by the authors

The correlation between competitive advantage and premiums, estimated by the correlation coefficient, is .94, which indicates a very high dependence. Thus, the presence of competitive advantages significantly affects the collected insurance premiums, and this requires constant development and high value for the consumer.

6. Conclusion

The results of the study allow us to draw the following conclusions. The insurance market in Ukraine is developing dynamically. At the same time, there is a need for further concentration of this market. This is due to the large number of small insurance companies. Such companies are not always able to provide quality and reliable services. Traditional insurance companies already operating in the market find it increasingly difficult to remain competitive against new trends, technologies and relatively low insurance premiums.

Insurance companies do not sufficiently innovate insurance products and introduce new services that cover new markets and risks. For example, the company ‘Hiscox’, based in Bermuda, has recently announced that it offers a new type of cyber insurance. It not only provides protection against cyber attacks, but also offers cybersecurity seminars and training modules designed to reduce the risks of future attacks.

Not all companies provide customers with a transparent calculation of insurance rates. Most policyholders would like their insurer to perform actuarial calculations to determine a more accurate premium. It is worth noting that the level of customer service, as well as online programs for calculating the cost of the policy are provided by all companies, so it no longer a significant competitive advantage. Insurers’ feedback needs to be improved by having, for example, chatbots that can answer questions instead of support.

The companies’ strategy is mainly aimed at attracting new customers. The issue of improving the quality of service to existing customers is not always a priority. What is the incentive for loyal customers to remain customers of an insurance company that gives priority to new customers at their expense? Companies need to pay attention to discounts and promotional offers, which were found in only 5 of the 19 analyzed entities. Insurers need to constantly think about what additional benefits they can offer their regular customers. This is not necessarily a cheaper insurance premium. For example, the insurance company Vitality offers its customers discounts on Starbucks drinks and vouchers for going to the cinema.

Domestic companies do not use all the benefits of scientific and technological progress. For example, the insurance company Lapetus uses customer identification technology and predicts the likelihood of future health problems. This means fewer administrative tasks and reduced costs. It is also possible to create chatbots and automated processing of customer requests. This will allow insurers to offer faster and more efficient interactions on the right channel at the right time.

An urgent issue is the creation of an optimal office network of the company, which is a certain attraction for consumers of insurance services. For a national company, branches must be located in each regional center. However, an excessive number of offices can also be a weak point for the company itself.

Often companies do not pay attention to the possibilities of optimal use of customer base data. It must be available and applied at all times. If, for example, the insurer knows that the customer does not respond to emails, but often interacts with messengers, these benefits should be considered for feedback.

Some insurance companies have not yet realized the fact that in order to strengthen competitive advantages, it is necessary to constantly monitor the ratio of certain assets and liabilities, comply with legislation on authorized capital and use the probability of bankruptcy as an indicator of urgent changes in financial management.

The greatest competitive advantages are received by those insurance companies that develop constantly in all directions simultaneously. By identifying their weaknesses and turning them into strengths, creating unique quality and (or) value propositions, companies significantly increase their attractiveness to consumers.
Increased amounts of insurance premiums become a fair reward for the acquired competitive advantages, which is insurers’ ultimate goal in the market.

7. Funding

This study received no specific financial support.

8. Competing interests

The authors declare that they have no competing interests.

References


The Impact of Digital Transformation on the Satisfaction of Tax Administration Users in Morocco during the Covid-19 Pandemic: An Empirical Study

I. Ait Lhassan†, O. Bedraoui‡‡, O. Akhannich‡‡‡

Purpose: The objective of any change in public administrations is to improve their management system to provide a better service to the citizen user. This is how policy makers defend their political agendas. However, the effectiveness of the digital transformation of public services is not limited to the promulgation of laws but to their impact on the satisfaction of users of public administration and its perception by the public agent and the citizen. The objective of this article is to analyze the impact of digital transformation on the satisfaction of users of public administration, and more particularly of tax administration.

Design / Method / Approach: This is an empirical study with a quantitative approach using a questionnaire administered to 107 taxpayers. We analyzed data through the structural equation method with SmartPls software to study the relationship between five sub-variables of digital transformation and user satisfaction.

Originality / Value: The results show a significantly positive relationship between three sub-variables of digital transformation and user satisfaction: perceived ease of use, perceived usefulness, and website design.

Research Limitations / Future Research: In addition, public administrations need to stay abreast of current trends in service digitalization. The success of the digitization of the administration is conditioned by the commitment and involvement of all stakeholders. This is with the view to providing quality services in real-time, thus meeting users’ expectations.

Paper type: Empirical

Keywords: digital, satisfaction, public administration, Morocco.

Reference to this paper should be made as follows:
Влияние цифровой трансформации на удовлетворенность пользователей налоговых служб в Марокко на время пандемии Covid-19: эмпирическое исследование

Мета работы: Целью таких изменений в государственных администрациях является улучшение их системы управления для предоставления лучших услуг гражданам-пользователям. В этом контексте политики защищают свои политические планы. Однако эффективность цифровой трансформации государственных услуг не ограничивается только объявлением законов, а также их влиянием на удовлетворенность пользователей государственного управления и его восприятие государственным агентом и гражданами. Целью этой статьи является оценка влияния цифровой трансформации на удовлетворенность пользователей государственного управления, в частности налогового управления.

Приемы/результаты исследования: Это эмпирическое исследование с количественным подходом с использованием анкет, разосланной среди 107 налогоплательщиков. Мы проанализировали данные с помощью программного обеспечения SmartPLS, чтобы выявить связь между пятью подзменами цифровой трансформации и удовлетворенностью пользователей.

Оригинальность/ценность исследования: Результаты показывают значительный положительный связь между тремя подзамами цифровой трансформации и удовлетворенностью пользователей: визуальное простота использования, восприятие полезности и дизайном веб-сайта.

Обмеження дослідження/Перспективы дальнейших исследований: Кроме того, государственные администрации должны следовать современным тенденциям цифровизации. Успешная цифровизация определяется отличительностью и привлечением всех заинтересованных сторон. Целью этих изменений является предоставление качественных услуг в реальном времени, отвечающих ожиданиям пользователей.

Тип статьи: Эмпирический

Ключевые слова: цифровая трансформация, удовлетворенность, государственное управление, Марокко.
1. Introduction

Since the 1990s, socioeconomic and religious contexts have experienced profound changes and a revolution at all levels. Moreover, from that time on, the almost generalized opening of borders to the movements of capital and people, and the policies of disintermediation, deregulation and decompartmentalization have provoked true globalization of markets worldwide (Fontaine, 2009). This openness has had a direct impact on technology, particularly in computer and telecommunication sectors.

In the face of this globalization, leadership styles, decision-making processes, organizational modes, service delivery, and citizenship concepts must change and improve as regards the way to meet the expectations of an e-government phenomenon (Gil-García, Dawes, & and Pardo, 2018).

It is in this context that the Moroccan administration has been involved in major projects for the last two decades enabling the dematerialization of government flows and services, in particular the Moroccan Digital 2020 plan, National Plan for Administrative Reform (2018-2023), Digital Development Agency (DDA) created in 2017.

Moreover, the tax administration is an important lever for all economies, including the Moroccan economy, through its role in issuing and collecting taxes, which forces our country to adapt to these new trends, makes the country more attractive and improves the business climate.

Hence, the NICT (New Information and Communication Technologies) through e-services makes it possible to facilitate administrative procedures, accompany Very Small Medium Enterprises, and improve the business climate to attract more investors.

In this context, the Directorate General of Taxes was among the first administrations that adopted a dematerialized administrative process in order to make the Moroccan tax system more effective, efficient and transparent. Digital technology is the backbone of the New Economy and officially intends to participate in improving the relationship between the administration and a taxpayer (Adam, Ferrand, & Rioux, 2010; 627; Koubi, 2012, 37).

In the light of this article, we collected papers related to e-government and digital transformation from several databases (Scopus, Cairn, Google Scholar, Sciedirect), as well as we have limited the search on the basis of articles published for the last 5 years. This allowed us to observe that the theme of digitalization of administration arouses the interest of several researchers, especially for the last two years, and this is after the health crisis triggered by Covid-19 (Ibrahim, & Lenaikhal, 2021).

Moreover, following the spread of Covid-19 internationally, and in order to avoid direct contact between people, we have witnessed the dematerialization of several services, including services rendered by the Directorate General of Taxes, without the need for taxpayers to travel to file a claim, regularize their tax situation and obtain certificates.

It is in this context that we have been able to discover the importance of the NICT to bring closer the links between the tax administration and citizens, and to contribute to the reduction of the processing time of users’ requests.

It follows that we will first discuss the history and evolution of the tax administration in Morocco accompanied by the introduction of e-services (remote declaration and remote payment), then we will define the concept of e-services and similar concepts from the literature review to finally know the degree of user satisfaction from a questionnaire, which will allow us to know how the Moroccan tax administration is conceived by users.

2. Conceptual Background

2.1. Digital Transformation of Public Administration in Morocco

Digital transformation in private and public sectors offers companies and public administration the agility and flexibility they need to optimize their production and respond effectively to the demands of customers who, in turn, have become informed and connected. It also enables them to adapt quickly to market fluctuations and preserve and/or acquire their competitive position (Hachimi, Lhassan, & Belahdhiti, 2021). It is in this context that we can see that companies have migrated towards digitalization in recent decades. They have taken a more technological approach to exploit digital tools in day-to-day tasks, both at the individual and organizational levels, and to obtain more accessible and transparent data, faster processes and higher productivity. For Viau (2019), digital transformation refers to a process that aims to improve an entity by triggering significant changes in its properties through combinations of information technologies, computers, communication and connectivity.

In our paper, we chose to study digital transformation in public administration and more particularly in tax administration. Tax administration plays an important role and is a lever for all economies. Indeed, taxation remains one of the main channels of mobilization of resources for the benefit of the State and its dismemberments, essential resources for the coverage of public charges and the launch of development projects. Moreover, through the role played by tax authorities, namely the issue and collection of taxes, it becomes essential to seek the right balance and determine the conditions necessary for the establishment of cost-effective taxation for all stakeholders: partners, natural and legal persons.

2.2. Users’ Satisfaction

According to Philippe Varin (1999), “the satisfaction of users of public services and administrations becomes a prime indicator of public performance”. Today, the user is one of the main concerns of all governments in order to assess their level of satisfaction and understand their needs. Over the past 30 years, surveys and “barometers” have been established to capture citizens’ satisfaction. The best-known examples are the European Euro-barometer, the Common Measurement Tool in Canada, and the International City/County Management Association (ICMA) in the United States. This was accompanied by the introduction of public service charters to ensure a high level of service quality, particularly in the United Kingdom (1991) or France (1992, 2019), and public service mediators whose objective is also to ensure a high level of quality for citizens.

The use of a satisfaction survey is a practical way of assessing citizens’ perceptions of the quality of public services, and of emphasizing user satisfaction, rather than other performance indicators, such as cost or price. In addition to the debate on the quality of the methodology for capturing citizens’ perceptions, it seems that questions on citizens’ perceptions are quite effective in understanding how citizens assess public services.

3. Literature Review and Hypothesis Development

Based on the literature on information technology and digital transformation, the research undertaken in this direction has revealed several sub-variables that can measure the explanatory variable of our study. From this multitude of measurement indicators, we were able to choose five sub-variables that could meet our research objective while remaining consistent with our study context, namely the Moroccan tax administration.
3.1. Perceived Ease of Use and User Satisfaction of Tax Administration

Perceived ease of use can be defined as the extent to which the use of a specific system is easy (Dong et al., 2017), as defined by Davis (1989), who introduced the TAM (Technology Acceptance Model), as being “the intensity with which an individual believes that the use of a particular system will be without difficulty or extra effort” is the sense of convenience and ease that users feel when using a specific technology (Stocchi Michaelidou, & Micevski., 2019), or more simply perceived ease of use represents the degree of ease associated with using a system (Viswanath et al., 2003).

Perceived ease of use (PEOU) is considered a key indicator for the assessment and analysis of user acceptance of a particular technology or system, PEOU can be an important motivator for users to use technology (Amin, Rezaei, & Abolghasemi., 2014). Our first hypothesis is to study the effect of perceived ease of use on the user satisfaction of tax administration.

Some authors have studied the nature of the impact of perceived ease of use as a variable of digital transformation in other study contexts, including Amin et al. (2014) whose research results show that there is a positive relationship between PEOU and mobile user satisfaction. In the same context, Zaitul, Ramadhan, and Ilona (2018) also showed the same results, showing a positive effect between perceived ease of use and student-user satisfaction. According to Morosan (2012), users can adopt their behavior to the new technology if they perceive it as easy.

Similarly, the research by Sibona and Choi (2021) showed that Facebook users perceive the site as easy to use; hence, PEOU is considered a statistically significant predictor of satisfaction. In another scientific work similar to ours, Tahar et al. (2020) reported that PEOU has a positive effect on user satisfaction in terms of the degree of use of e-filling in the Directorate-General of Taxation of Indonesia.

3.2. Perceived Usefulness and User Satisfaction of Tax Administration

Perceived usefulness is another indicator which is also based on the TAM model and represents the degree of acceptance of digital transformation by users. This indicator is related to the efficiency and productivity of a new technology or system and its benefits in improving user performance (Davis, 1989).

In other words, the more useful a system is, the greater the desire of users to use it is (Brandon-Jones & Kappi, 2018). Thus, perceived utility can be defined as users’ judgment that the technologies they adopt will improve the quality of their work (Keni, 2020). Our second hypothesis revolves around the effect that perceived usefulness may have on user satisfaction.

Some researchers dedicated their work to investigating the nature of the effect that perceived usefulness may have on user satisfaction in other research areas, including Sibona and Choi (2021). They consider perceived usefulness as a statistically significant indicator of satisfaction. They even infer that the perceived usefulness of a site has a greater impact on satisfaction than perceived ease of use. Keni (2020) shared the same view affirming the significant and important role that perceived utility plays in a consumer’s attitude and consequently in his satisfaction and confidence by identifying trust as a mediating factor in relation to satisfaction.

Similarly, the work by Amin et al. (2014) shows that there is a positive relationship between perceived usefulness and mobile-user satisfaction. However, the research by Zaitul et al. (2018), which focused on students from four faculties to investigate the determinant of satisfaction when using websites, refuted this hypothesis by showing the absence of a significant relationship between perceived usefulness and user satisfaction.

3.3. Perceived Confidence and User Satisfaction of Tax Administration

Confidence is a significant factor in the acceptability of online services and digital transformation (Zhou, 2012). Confidence in e-services means that users believe in the honesty, credibility and goodwill of the websites and e-services they visit (Reza et al., 2020). Confidence presents the level of users' belief and their expectations that the organization will not betray or disappoint as previously agreed. Based on the literature, trust and user satisfaction are strongly linked to the extent that trust is seen as an important factor influencing users’ behavior towards a technology or system in particular online transactions (Zampou et al., 2012).

Wetsch (2006) suggested that confidence has a significant impact on user satisfaction. Other authors have thus made the same observation, say, Amin et al. (2014), whose study focused on mobile users, concluding that confidence positively influences mobile user satisfaction. The study by Colesca and Dobrica (2008) provides empirical evidence that perceived confidence is a statistically significant factor influencing users’ decisions to adopt and use e-government.

3.4. Perceived Quality and User Satisfaction of Tax Administration

Based on the literature review, we can define perceived quality as “the consumer’s judgment of the degree of excellence or superiority attributed to an entity” (Zeithaml, Parasuraman, & Malhotra, 2000). Perceived quality is the result of a comparison between customers’ expectations and actual service experiences (Grönroos, 1984). In other words, the difference between users’ expectations regarding the performance of the service and their perceptions of the service received is the set of attributes contributing to the quality of an online service whose level is previously set by the company regardless of the perception that the user may have.


In many publications by researchers from different disciplines, perceived quality of service is seen as a significant predictor of customer satisfaction, high quality of service leads to higher perceived quality, which in turn leads to better user satisfaction (Parasuraman, Zeithaml, & Berry, 1985; Zefreh, Hussain, & Sipos, 2020). In the railway industry, for instance, the study conducted by Geetika (2010) in India found that perceived quality is an essential determinant of user satisfaction. In the same context, Mouwen (2015) studied 16 service attributes to determine the factors that contribute to rail users’ satisfaction, the results of this study reveal the most important attributes affecting user satisfaction, including speed of travel, punctuality and quality of service.

3.5. Website Design and User Satisfaction of Tax Administration

The last variable we considered representative of digital transformation was the design of a website. The website is a set of web pages and resources linked by hyperlinks and intended to provide a user with the information and data he is looking for, comprising functional characteristics relating to the functionalities of the website such as an aesthetic design, the organization and professionalism of an interface design to be understandable and easy to use (Legault, 2011). Thus, to satisfy users, “a website must be designed for a targeted customer segment... Local adaptation must be based on a comprehensive understanding of the culture of a client group” (Gommons, Krishman, & Schefföld, 2001).
The relationship between the design features of a website: customization, structure, navigation, layout, search and performance, and user satisfaction has been studied among 798 online banking users in Iran. The study shows a significant relationship between the two variables (Dianat et al., 2019). Another study conducted by Chakib (2019) also showed that the website design, a dimension that the author proposed as an indicator to measure perceived quality, has a positive impact on user satisfaction.

On the other hand, Wilson, Keni, and Tan (2019) studied the relationship between a website design and user satisfaction. The results of their study showed that a website design has a positive effect on user satisfaction.

4. Research Model and Hypotheses

The research framework was constructed to determine the effect of e-services on the satisfaction of tax administration users with reference to previous research. Thus, the model proposed in this study is presented in Fig. 1.

5. Research Methodology Adopted

Based on the literature review presented before, our research hypotheses can be formulated as follows:

\[\begin{align*}
H_1 &: \text{Perceived ease of use has a positive effect on user satisfaction.} \\
H_2 &: \text{Perceived utility has a positive effect on user satisfaction.} \\
H_3 &: \text{Perceived confidence has a positive effect on user satisfaction.} \\
H_4 &: \text{Perceived quality has a positive effect on user satisfaction.} \\
H_5 &: \text{The design of a website has a positive effect on user satisfaction.}
\end{align*}\]

5.1. Sample and Questionnaire Administration

The target population of this study was users of the e-services of the tax administration in Morocco, who are taxpayers (companies, professionals, individuals, occasional users and partners). A purposive sampling technique was used to distribute the questionnaires to respondents.

The questionnaire was tested on a sample of 30 respondents (managers and business owners in Morocco) to ensure that they fully understood the questions and were not likely to refuse to answer.

The final version of the questionnaire measured all items (29 items) on a five-point Likert scale, according to the authors Zhou (2011b), Wang and Liao (2007) and Revels, Tojib, and Tsarenko (2010).

In our research, we measured the five variables (21 items) through a 5-point Likert scale, ranging from “strongly disagree” (1) to “strongly agree” (5). In addition, we measured the variable User Satisfaction (8 items) with a 5-point scale, ranging from “very dissatisfied” (1) to “very satisfied” (5).

The questionnaire was administered to 375 target respondents. 114 were returned completed at an initial response rate of 30.40%. Of these 114 responses, seven (7) responses were unusable due to missing data, so the actual response rate is 28.53%. Eventually, the data by 107 taxpayers in Morocco could be processed.

5.2. Operationalization of Variables: the Measurement Instrument

The literature review allows us to develop scales for all the variables to be explained. For each item, respondents were given the opportunity to express their opinions on a five-point Likert scale (Tab. 1).

5.3. Structure of the Sample

Our sample is composed of taxpayers (Tab. 2) who break down as follows: 49% companies (large companies and VSEs/SMEs), 19% professionals (flat rate and RNR/RNS), 18% individuals (civil servants and employees and other declared income).

As shown in Tab. 3, 46% of the taxpayers surveyed go to the tax authority located in Tangier, 19% in Rabat, 17% in Fez and the rest are spread over other cities in Morocco, such as Kenitra, Marrakech and Agadir.

The results in Tab. 4 show that 94% of the respondents are Moroccan residents and 6% are Moroccan residents living abroad.

6. Results

In our statistical analysis of this study, we used the structural equation method via SMARTPLS software to perform two evaluations; one is the evaluation of a measurement model, convergence validity and discriminant validity. This is an evaluation of a structural model; we used it to test the correlation between the variables and test our hypotheses.

The results given in Tab. 5 show that Cronbach’s alpha has an alpha value that is greater than 0.7, a Rho_A value is greater than 0.7, a composite reliability value is greater than 0.7 and an AVE value is greater than 0.5, which indicate the validity of convergence and are consistent with the scientific standards of management science.
Table 1: Research measurement tool

<table>
<thead>
<tr>
<th>The variables</th>
<th>The sub-variables</th>
<th>Number of items</th>
<th>The authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital transformation</td>
<td>Perceived ease of use</td>
<td>4</td>
<td>Tahar et al (2020); Zaitul et al. (2018); Amin, et al., (2014); Morosan (2012); Sibona, &amp; Choi (2021).</td>
</tr>
<tr>
<td></td>
<td>Perceived usefulness</td>
<td>5</td>
<td>Keni (2020); Amin et al. (2014); Sibona, &amp; Choi (2021).</td>
</tr>
<tr>
<td></td>
<td>Perceived confidence</td>
<td>4</td>
<td>Amin et al. (2014); Colesca, &amp; Dobrica (2008); Wetsch (2006).</td>
</tr>
<tr>
<td>User satisfaction</td>
<td></td>
<td>8</td>
<td>The indicators for the sub-variable: user satisfaction is derived from the survey conducted in 2013 by the Directorate General of Taxes (Morocco) among its users to assess their perceptions and expectations regarding it, and thus to identify the levers for improving the quality of its services. The eight indicators are selected from the twelve indicators according to the context of the digital transformation adopted by the Directorate General of Taxes (Morocco).</td>
</tr>
</tbody>
</table>

Source: completed by the authors

Table 2: Classification of Respondents by Taxpayer Category

<table>
<thead>
<tr>
<th>Taxpayer Category</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large companies</td>
<td>21</td>
<td>20%</td>
</tr>
<tr>
<td>VSE/SME</td>
<td>31</td>
<td>29%</td>
</tr>
<tr>
<td>Professionals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flat rate</td>
<td>11</td>
<td>10%</td>
</tr>
<tr>
<td>RNR/RNS</td>
<td>10</td>
<td>9%</td>
</tr>
<tr>
<td>Individuals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil servants and employees</td>
<td>16</td>
<td>15%</td>
</tr>
<tr>
<td>Other declared income (property tax, etc.)</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Occasional users</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other users who do not have a tax file (occasional operations, stock exchange, etc.)</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td>Partners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chartered accountant</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td>Certified accountant</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>107</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: completed by the authors

Table 3: The tax administration cities that respondents frequently visit

<table>
<thead>
<tr>
<th>Cities</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangier</td>
<td>49</td>
<td>46%</td>
</tr>
<tr>
<td>Kenitra</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>Fez</td>
<td>18</td>
<td>17%</td>
</tr>
<tr>
<td>Rabat</td>
<td>20</td>
<td>19%</td>
</tr>
<tr>
<td>Casablanca</td>
<td>11</td>
<td>10%</td>
</tr>
<tr>
<td>Marrakech</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td>Agadir</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>107</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: completed by the authors

Table 4: Classification of respondents by residence

<table>
<thead>
<tr>
<th>Respondent’s residence</th>
<th>Number of respondents</th>
<th>Percentage of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resident in Morocco</td>
<td>101</td>
<td>94%</td>
</tr>
<tr>
<td>Moroccan resident abroad</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>107</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: completed by the authors

6.1. Discriminant Validity Test

The Fornell-Larcker criterion is the method of assessing discriminant validity. Discriminant validity can be verified when the square root of the AVE of particular constructs is greater than the correlation coefficient between those constructs and others (Fornell & Larcker, 1981). It compares the square root of the AVE value with the correlation of a latent variable.

As shown in Tab. 6, the results confirm that the square root of the AVE is greater than the corresponding correlation coefficient, indicating that discriminant validity is established according to the Fornell–Larcker criterion.
6.2. Tests of the Structural Model

After confirming that the construction measurements are reliable and accurate, the next step is to evaluate the performance of the structural model. This means exploring the model’s predictions, possibilities and relationships between the constructs and hypothesis testing. At this level, we test the goodness of fit of our model, the quality of the regression by the R², and the validity of our research hypotheses.

We will start with the quality of the regression and the test of the hypotheses to deduce the R² and the AVE allowing us to test the quality of fit.

6.2.1. Testing the Quality of the Regression

The coefficient of determination R² allows us to measure the fit of the model to the observed data or that the point regression equation is appropriate to describe the distribution of the points. Tab. 7 presents R² values.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>R²</th>
<th>R Square Adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>User satisfaction</td>
<td>.320</td>
<td>.283</td>
</tr>
</tbody>
</table>

Source: completed by the authors

Chin, Peterson, and Brown, (2008) suggested that R-squared values of 0.67, 0.33, and 0.19 in PLS-SEM could be considered substantial, moderate, and low, respectively. Besides, he recommended that R² values greater than .670 were considered high, while the values between .330 and .670 were moderate, while the values between .19 and .330 were low, and R² values less than .190 were unacceptable in PLS-SEM. In addition, Falk and Miller (1992) proposed an R-squared value of .10 as a minimum acceptable level.

R² of our model is equal to .320, which shows that our model is low but acceptable as recommended by the authors previously.

6.2.2. The Quality of the Fit

The objective of the GoF is to report on the study model at two levels, first, the measurement model and, second, the structural model with an emphasis on the relevance of the model.

The goodness of fit is estimated by the Goodness of Fit (GoF) index, it is calculated as $GoF = \sqrt{R^2 \times AVE}$.

After calculating the GoF, we found that it is up to .475. According to the authors’ recommendations (Wetzels, Odekerken-Schröder, & Van Oppen, 2009), the value of the GoF (above .360) of our model is good to allow us to consider a good quality of fit of our PLS model.

6.3. Hypothesis Testing and Results

Tab. 8 presents the validity of the hypotheses of our research. According to the analyses and in order for the hypotheses to be confirmed, the t-value must be greater than or equal to 1.986, and the p-value must be less than or equal to .050.

Table 8: Validity of hypotheses

| Hypothesis | Initial sample (O) | Sample average (M) | Standard deviation (STDEV) | T-value (|O/STDEV|) | P-value | Results |
|-------------|-------------------|--------------------|---------------------------|-----------------|---------|---------|
| WD -> US   | .247              | .255               | .106                      | 2.335           | .010    | Confirmed |
| PC -> US   | -.082             | -.081              | .105                      | .778            | .218    | Unconfirmed |
| PEU -> US  | .166              | .162               | .098                      | 1.982           | .039    | Confirmed |
| PQ -> US   | .121              | .118               | .123                      | .987            | .162    | Unconfirmed |
| PU -> US   | .286              | .291               | .123                      | 2.324           | .010    | Confirmed |

Note: WD: website design; PC: perceived confidence; PEU: perceived ease of use; PQ: perceived quality; PU: perceived usefulness; US: user satisfaction

Source: completed by the authors

| Source: | completed by the authors |

Table 5: Validity of the measurement model

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Cronbach’s Alpha</th>
<th>Rho_A</th>
<th>Composite Reliability</th>
<th>Average Variance Extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived ease of use</td>
<td>-.745</td>
<td>-.747</td>
<td>.887</td>
<td>.797</td>
</tr>
<tr>
<td>Perceived usefulness</td>
<td>-.728</td>
<td>-.749</td>
<td>.845</td>
<td>.645</td>
</tr>
<tr>
<td>Perceived confidence</td>
<td>-.785</td>
<td>-.874</td>
<td>.870</td>
<td>.691</td>
</tr>
<tr>
<td>Perceived quality</td>
<td>-.858</td>
<td>.870</td>
<td>.904</td>
<td>.702</td>
</tr>
<tr>
<td>Web site design</td>
<td>.873</td>
<td>.892</td>
<td>.913</td>
<td>.724</td>
</tr>
<tr>
<td>User satisfaction</td>
<td>.875</td>
<td>.893</td>
<td>.908</td>
<td>.665</td>
</tr>
</tbody>
</table>

Source: completed by the authors
7. Discussion

From the results of the research, we distinguished that website design (WD) is positively related to user satisfaction (US) ($T = 2.335$, $p = .01$). Similarly, there is a direct relationship between perceived ease of use (PEOU) and user satisfaction (US) ($T = 1.982$, $p = .05$). This validates the hypothesis $H_1$ and hypothesis $H_3$. We found that our results are consistent with the results of previous studies by the authors (Gommans et al., 2001; Venkatesh et al., 2003; Legault, 2011; Amin et al., 2014; Dong et al., 2017; Sculthorpe et al., 2019).

Note that there is an indirect impact of perceived confidence (PC) and perceived quality (PQ) on user satisfaction (US) ($T = .778$, $p > .05$), which does not support the hypotheses $H_2$ and $H_4$. These results are not similar to the results of previous empirical studies by the authors (Wetsch, 2006; Amin et al., 2014; Colesca & Dobrica 2008; Zeithaml et al., 2000; Grönroos, 1984; Parasuraman et al., 1985; Zefreh et al., 2020), so we can say that, firstly, there is a difference between the Moroccan context and others in terms of trust in internet payment transactions, confidential data, etc. Secondly, for the variable of perceived quality, respondents can find difficulties such as technical problems of e-services during the Covid pandemic 19, where this problem can negatively impact user satisfaction.

The results also show a positive direct impact of perceived usefulness (PU) on user satisfaction (US) ($T = 2.324$, $p = .01$), which confirms the hypothesis $H_5$. We note that our results are consistent with the results of previous empirical studies by the authors (Amin et al., 2014; Zaitul et al., 2018; Keni, 2020; Sibona & Choi, 2021).

8. Conclusion

From the above, we have been able to discover in this article that all the definitions proposed by the various authors go in the same direction, highlighting the importance of digital transformation as a lever for the performance of public administration in general and tax administration in particular. The success of the digitalization of administration is conditioned by the commitment and involvement of all stakeholders, in order to provide quality services in real-time that allows meeting users’ expectations.

In this regard, following the research undertaken, it was found that several sub-variables could have an impact on user satisfaction. However, we selected five sub-variables that are likely to address our research focus:

- Perceived ease of use;
- Perceived usefulness;
- Website design;
- Perceived confidence;
- Perceived quality.

Based on the results obtained, following the elaboration of a rich and diversified questionnaire, we note that the first three hypotheses have a positive influence on users’ satisfaction. Still, the two others have a negative impact on taxpayers’ expectations.

In short, the results obtained constitute challenges that the Moroccan tax administration has highlighted to overcome in order to establish trust between users who frequent the tax administration and to provide a quality service in the shortest time possible. The improvement of these two points requires the will and commitment of both parties in order to satisfy users’ expectations on the one hand, and to improve the efficiency of administrative procedures on the other.

Our future research will seek to integrate other digital transformation practices into our model, studying them in other public administrations.

9. Funding

His study received no specific financial support.

10. Competing interests

The authors declare that they have no competing interests.

References


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The Effect of Thematic Store Atmosphere on Impulse Buying Behavior Mediated by Affection and Impulse Buying Tendency

V.N. Palilingan‡, A.S. Hussein‡‡, S.P. Prabandari‡‡‡

Purpose: This study focuses on identifying aspects that can influence the behavior of consumers who make purchases at thematic cafes in Malang. This study uses a thematic store atmosphere as an independent variable, impulse buying behavior as a dependent variable, as well as positive emotion and impulse buying tendency as mediating variables.

Design / Method / Approach: Quantitative approaches and explanatory research are used in this study. The respondents in this study were consumers who had visited the thematic cafe in Malang city, and a purposive sampling technique with a total sample of 200 respondents was used to determine the number of samples. The data collection method used a questionnaire, and the data were analyzed by PLS-SEM.

Findings: The findings of this study indicate that the thematic store atmosphere does not have a significant effect on impulse buying behavior. Meanwhile, positive emotion and impulse buying tendency were able to perfectly mediate the relationship between the thematic store atmosphere and impulse buying behavior.

Practical Implications: A thematic cafe with an atmosphere designed according to the concept of a theme that is carried out very well can produce feelings of pleasure, excitement or comfort so that consumers feel like exploring or enjoying the atmosphere of the cafe so as to encourage unplanned purchases.

Originality / Value: The thematic store atmosphere is based on the thematic cafe trend in the city of Malang. The researcher also tries to make this research more comprehensive by examining the relationship between an impulse buying tendency and positive emotion both of which are mediating variables.

Paper type: Empirical

Keywords: thematic store atmosphere, impulse buying behavior, positive emotion, impulse buying tendency, thematic cafe.

Reference to this paper should be made as follows:
Вплив атмосфери тематичного магазину на поведінку імпульсивної купівлі, спричиненої емоційною складовою та імпульсивною тенденцією відносно придбання товару.

Мета роботи: Промисловість харчових продуктів і напоїв є однією з провідних галузей, що підтримує зростання виробництва та національної економіки в Індонезії. Ефективність сектору харчової промисловості завжди зростає і з кожним роком розвивається в позитивному напрямі. Це дослідження дозволить виявити аспекти, які можуть вплинути на поведінку споживачів, які здійснюють покупки в тематичних кафе Малангу. Це дослідження використовує тематичну атмосферу кафетерія як незалежну змінну та імпульсивну поведінку відносно купівлі як залежну змінну. При цьому позитивні емоції та імпульсивна тенденція придбання товару сприймаються як опосередковані змінні.

Дизайн / Метод / Підхід дослідження: Це дослідження базується на кількісних підходах та пояснювальних дослідженнях. Респонденти в цьому дослідженні - споживачі, які відвідали тематичні кафе в місті Маланг, і для визначення кількості зразків була використана цілеспрямована методика вибірки із загальної вибірки 200 респондентів. Метод збору даних використовувався за допомогою анкети, а самі дані були проаналізовані за допомогою аналізу PLS-SEM.

Результати дослідження: Результати цього дослідження свідчать про те, що тематична атмосфера кафе не має суттєвого впливу на поведінку імпульсивних покупок. Тим часом позитивні емоції та тенденція до імпульсивних покупок змогли ідеально опосередкувати зв’язок між тематичною атмосферою кафе та імпульсивною поведінкою придбання товарів.

Практична цінність дослідження: Тематичне кафе з атмосферою, розробленою відповідно до концепції теми, яка дуже добре впроваджена, може викликати відчуття задоволення, хвилювання або комфорту, що спонукає бажання досліджувати або насолоджуватися атмосферою кафе, що, в свою чергу, спонукає до незапланованих покупок.

Оригінальність / Цінність дослідження: Тематична атмосфера кафе заснована на тренді тематичного кафе в місті Маланг. Автори також намагаються зробити це дослідження більш комплексним, досліджуючи зв’язок між імпульсивною тенденцією відносно придбання товару та позитивними емоціями, обидві з яких є опосередкованими змінними.

Тип статті: Емпіричний

Ключові слова: тематична атмосфера кафе, імпульсивна купівельна поведінка, позитивні емоції, тенденція імпульсивних покупок, тематичне кафе.
1. Introduction

The food and beverage industry is currently growing rapidly and is becoming one of the leading sectors that supports manufacturing growth and the national economy since 2021 (Siregar, 2021). Although throughout 2020 the food and beverage industry experienced a negative performance of 6.84% due to the effects of the Covid-19 pandemic, in the 3rd and 4th quarters of 2019 the food and beverage industry grew again and was positive (Data Industri, 2021). The development of the food and beverage industry is driven by a number of social and economic trends such as changes in people’s lifestyles.

Lifestyle changes that occur in the community have triggered the emergence of many new cafes in Indonesia (Priambudi, 2020), one of which is in the city of Malang. The city of Malang is the second-largest city in East Java both in terms of area and population after the city of Surabaya (Kusnandar, 2019), the second student city after Yogyakarta (Wilayu, 2010) and has a society that is classified as consumptive (Badan Pusat Statistik, 2020) that makes entrepreneurs see a good opportunity for the growth of their business.

The culture of dining in cafes has become a new lifestyle because it is very fun to sit together, chat, relax, or do tasks at the cafe accompanied by food ordered by consumers. However, in fact, this activity is a challenge for entrepreneurs. Some people spend a lot of time in cafes with minimum purchases plus minimum prices, but with the duration of a chat together or just sit quietly doing tasks that are not short. Therefore, entrepreneurs need to encourage consumers to buy impulsively because it is very important to increase sales income of cafes.

Impulse buying has increased over the past two decades as a result of economic and social improvements as a dramatic increase in personal income, lifestyle, and credit availability has made impulse buying a widespread phenomenon (Park & Dhandra, 2017). Bhakat and Maruganantham (2018) states that impulse buying is a phenomenon that accounts for the large volume of products sold every year, also food and beverages are the most frequently spent spontaneously (Gaile, 2017).

It is very important for restaurant management to know the factors that influence consumers’ impulsive buying behavior. The cafe business provides many opportunities for consumers to make impulse purchases because situational motives such as a cafe atmosphere affect impulse buying behavior in food and beverage consumption (Miao & Mattila, 2018). Attractive menu variants or affordable prices are no longer a top priority for consumers, but the atmosphere of a cafe is also an important factor in determining where consumers will decide to go (Su, & Lu, 2018).

Cafes with a thematic topic are currently popping up in the city of Malang and are liked by many people. Thematic cafes have organizational concepts and narratives that are made visible and real in the interior and exterior of a restaurant. Eating is not the only, or even central, hallmark of visits to thematic cafes (Sørensen et al., 2020). Attractive thematic cafe atmospheres will encourage consumers to purchase and make it possible to spend more money than planned (Sujana, Suwendra, & Suwena, 2020). The atmosphere of a cafe is an important stimulant that can produce the desire to buy impulsively (Graa, Dani-Elkebir, & Bensaid, 2014).

The inconsistency of the results of previous studies that resulted in differences in researches (Gudonavičienė & Alijosienė, 2015; Saad & Metawie, 2015; Atulkar & Kesari, 2018; Jhawar & Kushwaha, 2018) has become a research gap that is interesting for further research on how the actual influence of a thematic store atmosphere affects impulse buying behavior and how to overcome the research gap found. Therefore, the writer included mediator variables to bridge the research gap in this study. To cover the research gap in this study, the writer included the mediator variables that are positive emotions and an impulse buying tendency. It is supported by previous researches that explain that positive emotions and an impulse buying tendency are able to mediate the relationship between a thematic store atmosphere and impulse buying behavior (Nandhu, Andriani, & Edriana, 2017; Bhakat & Maruganantham, 2018; Ahmad et al., 2019; Ahn, & Kwon, 2020; Parsad, Prashar, & Tata, 2017). This research aims to provide the behavior of consumers who make purchases at thematic cafes in Malang and uses a thematic store atmosphere, impulse buying behavior, positive emotions and an impulse buying tendency.

2. Theoretical Background

2.1. Thematic Store Atmosphere

According to Hsu and Power (2020), a thematic cafe is a cafe that emphasizes a unique concept in terms of building characteristics, decoration, architecture, a cafe atmosphere, props, a musical style, and personality designated in a particular place or a combination of all with not much attention paid to the food. The indicators used to measure a thematic store atmosphere were adapted from Jackson (2015), namely a store exterior, a general interior and a store layout.

2.2. Impulse Buying Behavior

Heryian and Tamlarasii (2020) define impulse buying behavior as sudden buying behavior, where the speed of an impulse decision-making process inhibits thoughtful and deliberate consideration of information, and alternative choices are available. The indicators used to measure impulse buying behavior were adapted from Fauzi, Welse, and Susanto (2019), namely spontaneity, out of control, non-cognitive evaluation, and disregard of consequences.

2.3. Positive Emotion

According to Delplanque and Sander (2021), positive emotions are an emotional reaction that is able to bring positive feelings to someone who experiences it. This includes interest, a sense of amusement, pride, joy, pleasure, satisfaction, affection, admiration, relief and excitement. The indicators used to measure positive emotions in the adaptation by Zhang, Dong and Zhao (2021) are joy, interest, contentment, and love.

2.4. Impulse Buying Tendency

Impulse Buying Tendency is a tendency, preference or inclination of an individual to make unplanned purchases and purchase spontaneously with little or no deliberation or consideration of possible consequences (Badgaiyan, Verma & Dixit, 2016). The indicators that are used to measure impulse buying were adapted from Verplanken and Herubadi (2001), namely cognitive aspects and affective aspects.

The hypothesis of this study are:

H1: Thematic Store Atmosphere has a significant effect on Impulse Buying Behavior.

H2: Thematic Store Atmosphere has a significant effect on Positive Emotion.

H3: Positive Emotion has a significant effect on Impulse Buying Behavior.

H4: Thematic Store Atmosphere has a significant effect on Impulse Buying Tendency.

H5: Impulse Buying Behavior has a significant effect on Impulse Buying Tendency.

H6: Impulse Buying Tendency has a significant effect on Positive Emotion.

H7: The effect of Thematic Store Atmosphere on Impulse Buying Behavior is mediated by Positive Emotion.
H8: The effect of Thematic Store Atmosphere on Impulse Buying Behavior is mediated by Impulse Buying Tendency.

3. Research and Methodology

3.1. Conceptual Framework of the Research

This study investigates four main constructs consisting of one independent variable (thematic store atmosphere) and one dependent variable (impulse buying behavior). In addition, this study also adds two mediator variables (positive emotions and impulse buying tendency). For more details, see Fig. 1.

![Conceptual Framework of the Research](image)

**Figure 1.** Conceptual framework of the Research

**Source:** developed by the authors

This research was conducted in an effort to test, explain, and confirm the theory in a knowledge by using a quantitative approach and used explanatory research.

3.2. Participants and Data Collection

Customers of thematic cafes in Malang City are people who have visited thematic cafes at least twice. Since there are certain criteria for selecting the sample, a non-probability approach with a purposive sampling technique was used to select the sample in this study, and the sample in this study amounted to 200. The data collection technique in this study used a questionnaire. This research was being conducted from June to July 2021.

3.3. Data Analysis

The method of data analysis used SEM (Structural Equation Modeling) based on Partial Least Square (PLS) that uses SmartPLS 3.0 software application.

3.4. Measurements

All indicators to measure the four variables were adopted from several previous studies. The indicator of thematic store atmosphere variables was adapted from Jackson (2015) which consisted of 3 indicators. Impulse buying behavior variables were adapted from Fauzi et al., (2019) that were measured through 4 indicators. Positive emotion variables were measured through 4 indicators from Zhang, et al. (2021). Impulse buying tendency variables were measured through 2 indicators from Verplanken and Herrabadi (2001).

4. Result

Based on the consumers’ latest education, it is known that 17.5% or 27 respondents have the latest education of high school/equivalent, then 10.5% or 2 respondents have the latest education diploma, then 75.0% or 150 respondents have the latest undergraduate education, amounting to 10.0% or 20 respondents have the latest master’s education and 5% or 1 respondent chose not to answer. Based on the consumers’ work, it is known that 42.0% or 84 respondents are private employees/BUMN (Badan Usaha Milik Negara) or state-owned enterprise, 35.5% or 71 respondents are students (i), and 22.5% or 45 respondents are entrepreneurs.

Based on monthly income, the majority of visitors to thematic cafes in Malang City are those who have a monthly income of Rp 3,000,000 (USD 208.47) up to Rp 6,000,000 (USD 416.95) that is equal to 45.0% or 90 respondents. Based on the frequency of visits, it shows that most of the respondents in this study are visitors to thematic cafes in the city of Malang who have visited thematic cafes more than twice with a total of 180 respondents, and the remaining 20 people are respondents who visited thematic cafes twice.

Tab. 1 indicates that the scale, magnitude, and statistical congruence have been accepted. The average variance extracted (AVE) value of all latent variables shows a score of .834 for the Thematic Store Atmosphere variable, .582 for the Impulse Buying Tendency variable, and .802 for the variable of Positive Emotions, and .659 for the variable of Impulse Buying Behavior. The value of Cronbach’s alpha is worth high enough reliability criteria; Thematic Store Atmosphere has the highest Cronbach’s alpha value.

Sequentially, the value of Cronbach’s alpha for the four variables used in this study ranged from .836 to .978, so it was acceptable.

**Table 1: Composite Reliability & Cronbach’s Alpha 2021**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Composite Reliability</th>
<th>Cronbach’s Alpha</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thematic Store Atmosphere</td>
<td>.980</td>
<td>.978</td>
<td>.834</td>
</tr>
<tr>
<td>Impulse Buying Tendency</td>
<td>.873</td>
<td>.836</td>
<td>.582</td>
</tr>
<tr>
<td>Positive Emotion</td>
<td>.970</td>
<td>.963</td>
<td>.802</td>
</tr>
<tr>
<td>Impulse Buying Behavior</td>
<td>.939</td>
<td>.926</td>
<td>.659</td>
</tr>
</tbody>
</table>

**Source:** completed by the authors

Composite reliability (CR) values are .980, .873, .970, .939 (above .80), it can be concluded that all constructs are reliable, both according to composite reliability and Cronbach’s alpha. The R-square value of the variable of impulse buying behavior in this research model is .837. The goodness of Fit (GoF) in this study is calculated using the equation Q² = 1 – [(1 – R²) (1 – R²) (1 – R²)] = 1 – [(1 – .255) (1 – .379) (1 – .837)] = .925. A score of .925 in the calculation Q-Square indicates that the model in this study can be said to have good goodness of fit.

Tab. 2 presents the hypothesis testing results. The direct influence is presented, a thematic store atmosphere has an insignificant effect on impulse buying behavior, with a path coefficient of .044 and a p-value of .262 (more than the significance value of .05), and then H1 is rejected, which means that the thematic store atmosphere does not have a significant influence on impulse buying behavior.

The effect of a thematic store atmosphere on positive emotions is known to be significant with a path coefficient of .131 and a p-value of .022 (under the critical value of .05). Based on these findings, H2 is accepted, which means that the thematic store atmosphere has a significant effect on positive emotions.

The influence of positive emotions on impulse buying behavior is known to be significant with a path coefficient of .708 and a p-value of .000 (under the critical value of .05). Based on these findings, H3 is accepted, which means that positive emotions have a significant effect on impulse buying behavior.
The effect of a thematic store atmosphere on an impulse buying tendency is known to be significant with a path coefficient of .505 and a p-value of .000 (under the critical value of .05). Based on these findings, H4 is accepted, which means that the thematic store atmosphere has a significant effect on an impulse buying tendency.

The influence of an impulse buying tendency on impulse buying behavior has a significant effect, with a path coefficient of .264 and a p-value of .000 (under the critical value of .05). Based on these findings, H5 is accepted. This means that the impulse buying tendency has a significant effect on impulse buying behavior.

The influence of an impulse buying tendency on positive emotions has a significant effect, with a path coefficient of .539 and a p-value of .000 (under the critical value of .05). Based on these findings, H6 is accepted, which means that the impulse buying tendency has a significant effect on positive emotions.

The indirect influence is presented, the role of positive emotions in mediating the relationship between a thematic store atmosphere and impulse buying behavior is known to be significant with a value of the path coefficient of .093 and a p-value of .024 (under the critical value of .05). These results indicate that when the research is accepted, it is not likely to be engaged in impulse buying. Thus, H7 is accepted.

The role of an impulse buying tendency in mediating the relationship between a thematic store atmosphere and impulse buying behavior is known to be significant with a value of the path coefficient of .272 and a p-value of .000 (under the critical value of .05). These results indicate that the impulse buying tendency can play a role in mediating the relationship between a thematic store atmosphere and impulse buying behavior. Thus, H8 is accepted.

5. Discussion

5.1. Effect of Thematic Store Atmosphere on Impulse Buying Behavior

The results of this study indicate that a thematic store atmosphere has no significant effect on impulse buying behavior. This can be interpreted that the atmosphere of a thematic cafe cannot directly make consumers purchase impulsively. The thematic cafe atmosphere is not able to make consumers buy impulsively without an internal evaluation from a consumer.

According to Mehrabian and Russell (1974), a stimulus will be processed by the internal state of an individual so that it will produce a response. So, a thematic café atmosphere which is a stimulus must be processed or evaluated first by the internal state of a consumer so that it can encourage consumers to buy impulsively.

This study is in accordance with the research conducted by Jhawar and Kushwaha (2018) which revealed that the involvement of a store atmosphere does not encourage someone to make a sudden purchase. Atulkar and Kesari (2018) show that there is a gap between a store atmosphere and impulse buying behavior when the results are not significant or negative because the attractiveness and enjoyment of a store encourage consumers to be less likely to be engaged in impulse buying. Gudonavičienė and Alližionienė (2015); Saad and Metawie (2019) also support this research where the researcher reveals that a store atmosphere has no significant effect on consumers’ impulsive buying behavior.

5.2. Effect of Thematic Store Atmosphere on Positive Emotions

The results show that a thematic store atmosphere has a significant effect on positive emotions. This result means that the thematic atmosphere of a cafe that is designed very attractively according to the theme carried will attract the eyes of consumers so that it will create feelings of pleasure, enthusiasm and even enthusiasm in consumers’ minds.

These results are consistent with the previous research by Sharma, Joshi, and Kumar (2019) which revealed that the overall perception of a store environment has a significant positive effect on consumers’ positive emotions. Chang, Chang, and Yeh (2013) revealed that positive emotions related to feelings of enthusiasm, movement, activities and alertness stem from reactions to atmospheric stimuli in an environment. Barros et al. (2019), Nandha et al. (2017), and Grau et al. (2014) also revealed the same thing that the atmosphere of a store that seeks to attract consumers’ attention will help create feelings of pleasure and excitement for consumers in doing exploration and buying in a cafe.
5.3. Effect of Positive Emotions on Impulse Buying Behavior

The results show that positive emotions have a significant effect on impulse buying behavior. This means that the more positive the feelings of thematic cafe consumers are, the more they will be able to create or increase impulse buying for thematic cafe customers. These results are in accordance with the previous research conducted by Nandha et al. (2017) which revealed that positive emotions are one of the most important aspects that needs to be considered in influencing consumers or potential consumers because they can encourage consumers to buy uncontrollably or unexpectedly. Graa et al (2014) also revealed that positive emotions felt by consumers were able to produce unplanned purchases. Consumers’ positive emotions such as happiness and pleasure can encourage the creation of impulse buying behavior by consumers themselves (Chang et al., 2013; González-Rodríguez, Domínguez-Quintero, & Paddison, 2019).

5.4. Effect of Thematic Store Atmosphere on Impulse Buying Tendency

The results show that a thematic store atmosphere has a significant effect on an impulse buying tendency. This means that the better the atmosphere of a thematic cafe is, the greater the incentive for consumers’ inclination or desire to make purchases without thinking at the thematic cafe is. The results of this study are also in accordance with the research conducted by Saad and Metwiiie (2015) which suggests that a good atmosphere from a store will affect consumers who have a tendency to buy impulsively. This is also supported by the previous study conducted by Bhakat and Muruganantham (2018), it concludes that when consumers have a tendency to buy impulsively, the atmosphere of a store will encourage consumers’ inclination and desire to buy impulsively.

5.5. Influence of Impulse Buying Tendency towards Impulse Buying Behavior

The results show that an impulse buying tendency has a significant influence on impulse buying behavior. This means that an individual who has a tendency to buy impulsively will create an impulsive buying behavior in another individual. This study is in accordance with the previous research conducted by Narvala Cantin, and Gibaja Martins (2019) where the tendency to buy impulsively is the most influential factor in determining an individual’s impulsive buying behavior. Atulkar & Kesari (2018) also revealed that impulse buying tendencies are closely related to consumer impulse buying behavior, where high impulse buying tendencies can make consumers decide to make purchases spontaneously, without any hesitation, and unexpectedly.

5.6. Effect of Impulse Buying Tendency on Positive Emotions

The results show that an impulse buying tendency has a significant effect on positive emotions. This means that the more individuals have a high tendency to buy impulsively, the more impulsive buying behavior an individual will have. Such traits as the tendency to buy impulsively are one of the most important elements for predicting a person’s emotions and behavior, and it is revealed that individual traits, which contain the tendency to buy, are a predictor of emotions (Sharma, Joshi, & Kumar, 2019). The results of this study are also in accordance with the research conducted by Ahmad et al., (2019) it also states that there is a positive relationship between impulse buying tendencies and a positive mood because every time consumers find an opportunity to shop instantly, they tend to show feelings of pleasure and satisfaction, they are happy and fulfilled. Anant et al., (2016) also found that the tendency of impulse buying has a significant positive effect on positive emotions or feelings.

5.7. Effect of Thematic Store Atmosphere on Impulse Buying Behavior through Positive Emotions

The results show that a thematic store atmosphere has a significant effect on impulse buying behavior through positive emotions. The impact of mediation of positive emotions is known to be complete mediation, thus it can be interpreted that in order for a thematic store atmosphere to have a significant influence on impulse buying behavior, it must be passed through positive emotions.

According to Mehrabian and Russell (1974), a stimulus will be processed by the internal state of an individual so that it will produce a response. The internal state is an internal process that allows an individual to evaluate, select, organize, and interpret external stimuli so that the process affects an individual’s behavior (Baron, & Paulus, 1991). Positive emotions become an important part of responding to environmental stimuli that are presented so that environmental interpretation affects what is felt by an individual (Halim & Brata, 2016).

5.8. Effect of Thematic Store Atmosphere on Impulse Buying Behavior through Impulse Buying Tendency

The results show that a thematic store atmosphere has a significant effect on impulse buying behavior through an impulse buying tendency. The mediating impact of an impulse buying tendency is known to be complete mediation, thus it can be interpreted that in order for the thematic store atmosphere to have a significant influence on impulse buying behavior, it must be passed through an impulse buying tendency. The impulse buying tendency bridges the influence of a thematic store atmosphere on consumers’ impulse buying behavior in thematic cafes in the city of Malang. The thematic store atmosphere is able to create and increase impulse buying behavior by creating an impulse buying tendency for consumers of thematic cafes in the city of Malang.

According to Mehrabian and Russell (1974), a stimulus will be processed by an individual’s internal state so that it will produce a response. The results of this study are in accordance with the previous research which revealed that an impulse buying tendency is an internal condition in which an individual has a tendency or preference to buy urgently or suddenly which cannot be resisted (Asif & Rahmadi, 2017). This irresistible urge or tendency to buy urgently or suddenly can generally result in a purchase when consumers believe that the action is normal, resulting in impulse buying behavior (Rook & Fisher, 1995).

6. Conclusion and Recommendation

6.1. Conclusion

The results of this study can conclude that a thematic store atmosphere has no direct effect on impulse buying behavior. The atmosphere of a thematic cafe cannot directly make consumers immediately make an impulse purchase because the influence of the environment must get individual’s internal processes first before the occurrence of an impulse buying response or action. Therefore, the store atmosphere of a cafe that is designed in such a way using an attractive theme will be able to make consumers make purchases unexpectedly or suddenly if consumers feel comfortable and happy with the atmosphere of a cafe. Likewise, the thematic cafe atmosphere will be able to increase the frequency of consumers buying impulsively when they are able to encourage consumers or create tendencies such as the desire to buy in a hurry or urgently.
6.2. Recommendations for Future Research

a. It is recommended for further research to expand the knowledge about the food and beverage industry, especially in the cafe sector by using several types of cafes or restaurants, by adding new theories, and taking different approaches so that research and discussions on cafe sector become better and continue to grow.

b. Further research can add other variables or replace the mediator variable in this study, such as testing a thematic store atmosphere on impulse buying behavior in the mediation of variables such as discounts, self-service outlets, or promotions.

c. This research in the future still needs to be enriched by increasing the number of respondents used as research samples, because a large number of research samples is expected to provide better research results.

d. Further research is also expected to collect and survey respondents directly to ensure more reliable respondents. Thus, it can minimize errors in research.

6.3. Limitation

Search on restaurants and tourist attractions that have their own uniqueness, it is hoped that in the future tourist attractions will be able to present a unique nuance that is different from the others.

7. Funding

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8. Competing interests

The authors declare that they have no competing interests.

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