The idea

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Foreword

It is with great pride that we present the 4th edition of the IDEA Journal of Applied Research (IDEA JAR), marking a significant milestone in the journey of IDEA Group and IDEA College. This special edition, the second for 2024, coincides with the celebration of IDEA Group's 20th anniversary and IDEA College's 10th year of operation. Over the years, IDEA has evolved from its humble beginnings into a robust institution that continues to push boundaries in education and applied research, empowering learners and professionals to impact their industries and communities.

In this landmark edition, we feature nine peer-reviewed articles, each contributing to our understanding of critical issues in diverse areas such as healthcare, education, technology, management, sustainability, and intergenerational practices. Together, these studies reflect the core values of IDEA—innovation, growth, and the commitment to excellence in applied research that addresses real-world problems.

Healthcare, Well-being and Education
The intersection of healthcare and well-being remains a key focus of applied research, especially in light of the increasing complexity of healthcare demands and societal needs. Two prominent studies in this edition delve into critical healthcare topics, from knowledge management in hospitals to managing emotional challenges in care facilities.

Dr Nadine Delicata's "A Review of the Knowledge Management System at the Quality Department in a Maltese Hospital" provides a critical evaluation of how knowledge management (KM) can transform both information flow and intellectual capital into sustained value. Delicata's study highlights the importance of KM in tackling the challenges faced by healthcare organisations, such as rising costs and the increasing need to improve the quality of care.

In another impactful study, Antoinette Laferla and Dr. Karl Spiteri explore the emotional toll on professionals working in long-term care facilities in "Managing Life in the Face of Death." This research identifies coping mechanisms, assesses stress, compassion fatigue, and burnout, and offers strategies to support healthcare workers frequently in contact with dying residents. Their work is vital for improving the quality of life for both caregivers and residents, an often-overlooked aspect of long-term care.

Adding to the healthcare discourse, Martina Mallia's study, "Knowledge and Awareness of Diabetes Mellitus Risk Factors among Educators in Primary Schools in Malta," bridges the gap between healthcare and education. Mallia's research aims to evaluate how well educators understand diabetes risk factors in children and how the educational system can better support health awareness, highlighting the need for increased health education among professionals working with young learners.

Geraldine Galea Gibson's work, "The Inclusion of Childcare Facilities into Existing Aging Facilities," brings a unique perspective to healthcare and well-being by advocating for intergenerational practices. Her study examines the integration of childcare centres within elderly institutions, creating meaningful interactions between children and the elderly. This forward-thinking initiative not only improves the quality of life for both age groups but also fosters a sense of community, reducing isolation and enhancing emotional well-being for the elderly.

Technology and Innovation
Technology's transformative role in society is further explored in this edition through the lens of artificial intelligence (AI) and its practical applications. Daniel Cassar Alpert and Dr Jeremy Scerri's study, "Correcting OCR Results through AI Predictions," highlights a pioneering approach in enhancing the accuracy of Optical Character Recognition (OCR) technology. By integrating Natural Language Processing (NLP) and AI-based models such as Google BERT, their study offers a novel solution to improve text recognition from damaged or poorly scanned documents. Their work showcases the power of AI in refining technological processes and overcoming common operational challenges.

Sana Sayyed's paper also has technology and innovation as a focus as it delves into the immersive capabilities of Virtual Reality (VR) in marketing. Her research, "The Impact of VR Storytelling on Brand Perception and Consumer Engagement," examines how VR can transform consumer-brand interactions by immersing audiences in captivating, emotionally resonant experiences. Using a combination of survey data and VR-based experiments, Sana demonstrates VR's unique potential to elevate brand perception, foster loyalty, and drive consumer engagement beyond the reach of traditional advertising. Her findings highlight VR as a powerful tool for brands aiming to distinguish themselves in a competitive market through high-quality, audience-tailored VR content.

Sustainability and Management

Sustainability and management practices have emerged as pivotal themes in today's business and organisational environments, and this edition of IDEA JAR brings forth several significant contributions in this area.

Elaine Zarb Giorgio and Dr. Alfred Quintano, in their study "Application of the Balanced Scorecard to Scout Groups: A Parents' Perspective," explore how Scout Groups within The Scout Association of Malta are evaluated using financial and non-financial metrics. By examining performance from the perspective of parents, their research uncovers insights into how organisations can effectively assess and improve their service quality through the balanced scorecard approach.

Grace Stivala and Owen Bugeja's study, "Consumer Dispute Resolution: Exploring Ways for Improvement," addresses a critical gap in the Maltese Consumer Dispute Resolution (CDR) setup. Their work identifies weaknesses in current processes and suggests improvements to make CDR more accessible and effective for both consumers and traders. This research highlights the importance of enhancing consumer rights and the mechanisms that uphold them.

Lastly, further extending the discussion on project management and organisational success, Ian Messina and Dr. Emanuel Camilleri's work, "Project Success – Main Causes of Project Delays and the Extent of the Improvement by the Application of the Critical Chain," reveals the factors contributing to project delays and proposes solutions through Critical Chain Project Management (CCPM). Their study offers practical insights for achieving timely project completion, a key consideration for managers across industries.

Conclusion

As IDEA celebrates two decades of growth and a decade of educational excellence, this special edition of the IDEA Journal of Applied Research evidences our commitment to fostering research that not only informs but transforms. These studies represent the cutting edge of applied research in their respective fields, offering innovative solutions and insights that resonate with our mission to make a lasting impact on society. We thank the authors for their contributions and look forward to the continued growth of applied research at IDEA.

Dr Nadia Vassallo
Principal IDEA College

01 Correcting OCR results through AI Predictions

Daniel Cassar Alpert & Dr. Ing. Jeremy Scerri

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Abstract

OCR (Optical Character Recognition), the process of reading text off an image, is prone to reading words incorrectly. This might be caused by the OCR engine itself or due to damage to the physical document.

This study is, to our knowledge, the first to attempt automated detection and replacement of invalid OCR by pre-processing the supplied images, using NLP (Natural Language Processing). NLP is used to split the text into sentences, highlight invalid text through a spell checker which are then processed through a Google BERT model to generate a list of possible predictions. Finally, the system compares the spell check suggestions and BERT predictions to determine the best replacement text.

For the results, the similarity amount to the original text is defined as Angular Separation (AS) which is the difference of angle in degrees between the resulting text compared to the original text (The smaller the AS, the closer the text is to the original page). The Angular Separation Ratio (ASR) is calculated as the percentage of change between the OCRd version and the final corrected text.

In the sample document used, the system managed to achieve an average AS of 0.3477° improvement per page (across 206 pages), or 0.0225° AS improvement per word changed. To put this into perspective, the distance before the process was of an average of 0.48° and after it got down to 0.45° giving it an average of 6.25% ASR improvement per word processed. The analysis also found that the spell checker highlighted certain words incorrectly and this made the result less favourable. Nonetheless the overall status was still considered a more accurate document compared to the original OCR.

Keywords: OCR; NLP; BERT; Spell Check; Correction.

Highlights:

- Improving overall accuracy of OCR'd text documents by an average of 6.25% per word processed through the first time use of combined spell check and NLP models.
- Automatically calculate and determine closest fitting word based on context and partial OCR.
- Gives the basis for further improvement to current OCR technology.

Introduction

Topic and Context
In recent times it has become the norm to digitise everything especially within the workflow of a company. This includes any type of documentation like for example; employment contracts, purchase orders, sales invoices, suppliers' invoices, receipts, legal documentation etc.

When a document starts off in digital format (eg typed as a word document and saved to pdf format) and remains in digital format throughout its lifetime, it contains the original text layer that can be used for indexing and searching purposes once stored digitally.

However, if at any point of the process the document finds itself printed to paper and requires to be scanned in order to get the digital version for storing, the text needs to be read off the image for indexing purposes. This is where there is a high risk of the text being read via OCR (Optical Character Recognition) to be inaccurate, especially if the paper got damaged, the printer had added artifacts to the page, text ink faded, handwriting added over printed text such as a signature and a myriad of similar incidents.

Focus and Scope
The scope of this research was to show that one can improve upon raw OCR results of such documents automatically through the use of existing AI tools by automatically detecting invalid text and replace it with the correct text through prediction models. Image processing was also used to improve the image quality and remove artifacts before it is run through the OCR process.

The concept is that the user will not be presented with any decision making and will simply feed an image and in return get the resulting text. The main focus was also on standard English language text since spell checking and text prediction models were used. Therefore, correction of numerical data is not possible and handling of other languages is considered as a future improvement.

Relevance and Importance
Companies have been moving into digitising all documentation at hand and moving to a paper-less working model. This contains 2 digitising processes, first; such companies need to digitise all their historical documents that are currently stored in files in shelves or in boxes in storerooms or warehouses and second; they need to digitise the incoming day-to- day documents to feed them as part of a digital workflow process.

The importance of having as much as an accurate text OCR for indexing is that once they are digitally indexed and stored, staff members would be able to easily lookup and search for any text found within any of the stored documents and also categorise them accordingly. In cases where the law states that the hard-copy needs to be retained, the stored digital copy could additionally contain a reference to the physical location of the original document (eg, Shelf 3, Box 1).

Apart from such company-related documents, this process is also valid when it comes to scanning to digitise existing books that are only available as hard copies. If they are older books especially, they might contain wear-and-tear, discolouration, faded text and also blemishes that could affect the OCR quality.

Main Objectives
The main objectives that this research project was set out to cover are as follows:

Scan or generate damaged documents - Virtually damaging documents was the ideal choice as this presented the ability of having the accurate text to compare to when it came to evaluating the results.

Process the scanned image - The images were passed through processing to prepare the image to be in its best condition possible before it is passed through the OCR process (this includes rotation and adaptive thresholding).

OCR - The resulting image is then to be passed through an OCR process which will result in the raw text that will be used by the rest of the process.

Spell/Grammar check - The resulting text is analysed to find any invalid words within the OCR results. This process highlights any text that the OCR didn't read correctly either due to a processing error or else due to damage on the document itself.

Text Prediction - The system then analyses the highlighted words and predict the replacement text to use in their stead.

Methodology

Metrics and Equations Used

The resulting angle calculations from the equations and algorithms used are returned as Radians, however when comparing and analysing they are then always converted to degrees. Degrees offer easier representation and readability since the values will then range between 0 and 90 instead of 0 and 1.57.

Equation 1 calculates the cosine similarity to get the angle in radians between two vectors, where D1 represents the word being compared and D2 represents the word that it is being compared to.

eq. 1 $$\cos d = \frac{D1.D2}{|D1||D2|}$$

Equation 2 calculates the score that the system uses to decide which suggested word is best fitting, where the SimilarityValue is the result from Equation 1 with some additional weight adjustment and SequenceMatcherRatio is the result of difflib's SequenceMatcher algorithm.

eq. 2 $$Score = SimilarityValue\ (1 - SequenceMatcherRatio)$$

OCR and Text Preparation

Since for the results evaluation process the original accurate text was needed, the process started off with plain text and digitally created a simulation of a scanned document out of it. Project Gutenberg, which consists of a group of volunteers who create free to use electronic books (e-books) in various formats including plain text files was made use of. The e-books are also manually vetted over time and in most cases their accuracy exceeds 99.95% (Hart, 2007). The text file was then split into multiple pages and converted to images. Each image then required degradation to simulate damaged or worn-out documents. Journet et al. (2017) found this same requirement for most researchers in the Document Image Analysis and Recognition (DIAR) sector and through their research created a tool called DocCreator. DocCreator offers a number of different layers to add to the document with various settings and intensity levels. Figure 2 below demonstrates the degradation levels added to the original images.

Fig 1 - Left: Original image, Right: Character Degradation + Phantom Character + Shadow Binding + Holes

For the OCR process, EasyOCR has been used. As described by Hasan (2023), EasyOCR makes use of deep learning execution based on PyTorch and is based on research and papers like CRAFT and CRNN. CRNN is a Neural Network that combines Convolutional layers that extract a sequence of so called 'features' or areas of interest from the image, and Recurrent layers that predict a label distribution on each image. The only pre-processing needed on the images was that of 'deskewing' in which text is automatically straightened since one of the layers within EasyOCR actually contains image correction algorithms including adaptive thresholding.

The resulting full-page text needed to be split into smaller chunks for processing. This could be achieved using the Natural Language Toolkit (NLTK). NLTK has been in development since 2001 and is widely used in research projects (Bird et al., 2019). nltk.sent_tokenize function takes the entire body of text and splits it into a list of strings representing all the separated sentences that can now be used to iterate through. Special characters also needed to be broken away from words so that they do not interfere with the spell-checker.

Spell Check

The first step before actually starting the spell check process is checking whether there are any words in the text that would need to be ignored. These would generally be names of persons or organisations since in most cases a spell checker would mark them as being invalid words. As Bird et al. (2019) explain, the Natural Language Toolkit (NLTK) offers the 'Named Entity Recognition' (NER) functionality that is required for this step. NER detects nouns that refer to a particular person, organisation, structure, location etc.

The spell checker is set to ignore these named entities as well as words where at least one half of the word is made up of digits. This can help filter out any numeric values, dates, time and so on which spell checker would also end up highlighting as an issue. SpellChecker by enchant. checker proved to be the best option offering a better invalid word detection as well as suggested replacement words. A list of suggested fixes by the SpellChecker would also be stored to be used later on to determine the best possible predicted word.

The original sentence that was checked by the spell checker is at this point modified to 'mask' the invalid words by replacing them with a [MASK] text. This is a way of marking them for BERT prediction in the next stage.

Example:

OCR result
The duil rhythmic tramp of the soldiers ' boots formed the background to Goldstein's bleating voice.

Masked errors following spell checker
*The **[MASK]** rhythmic tramp of the soldiers ' boots formed the background to Goldstein's bleating voice .*

Natural Language Processing

Google's BERT (Bidirectional Encoder Representations from Transformers) model has been used to get the invalid text that has been masked with the '[MASK]' tag. As Prakash (2021) explains, as a neural network, BERT requires input words parameters to be tokenised to assign them numerical values. Unlike LSTM (Long Short-Term Memory) architecture that could only learn the relationship between adjacent words, BERT is based on the Transformer architecture which is able to learn the relationship between all the words in a sentence at once.

BertTokenizer is then used to tokenise the sentence into words, and convert these tokens into Ids (tokenizer.convert_tokens_to_ids) that will be used for the torch inputs that are provided to the model. It has been initialised with a pre-trained model called 'bert-base-uncased' which does not differentiate between upper and lower case words (eg. English and english are seen as the same word).

Example:

Sentence
The [MASK] rhythmic tramp of the soldiers ' boots formed the background to Goldstein's bleating voice .

Tokenised
['the', '[MASK]', 'rhythmic', 'tram', '##p', 'of', 'the', 'soldiers', "'", 'boots', 'formed', 'the', 'background', 'to', 'goldstein', "'", 's', 'b', '##lea', '##ting', 'voice', '.']

Converted to Ids
[1996, 103, 14797, 12517, 2361, 1997, 1996, 3548, 1005, 6879, 2719, 1996, 4281, 2000, 25507, 1005, 1055, 1038, 19738, 3436, 2376, 1012]

Finally, the masked pre-trained BERT model 'bert-base-uncased' is loaded and the predictions for the '[MASK]' text is run. The predictions once again are made up if indexed words' Ids, and the top 50 are then taken and converted back to actual words using the tokenizer.convert_ids_to_tokens function.

Example:

Top 50 predictions
[1996, 1037, 1012, 1998, 1010, 2008, 2026, 2004, 2010, 1011, 2019, 2037, 1000, 2169, 2014, 2023, 2178, 1997, 1005, 2058, 2049, 2007, 2133, 24219, 14797, 2029, 2096, 2053, 3730, 2216, 2054, 2000, 1045, 3649, 3005, 1999, 1013, 2296, 2151, 2030, 2006, 1024, 2345, 2048, 2659, 2005, 1055, 4281, 2115, 2152]

Converted to Tokens
['the', 'a', '.', 'and', ',', 'that', 'my', 'as', 'his', '-', 'an', 'their', '"', 'each', 'her', 'this', 'another', 'of', "'", 'over', 'its', 'with', '...', 'unmistakable', 'rhythmic', 'which', 'while', 'no', 'soft', 'those', 'what', 'to', 'i', 'whatever', 'whose', 'in', '/', 'every', 'any', 'or', 'on', ':', 'final', 'two', 'low', 'for', 's', 'background', 'your', 'high']

Comparison Algorithm

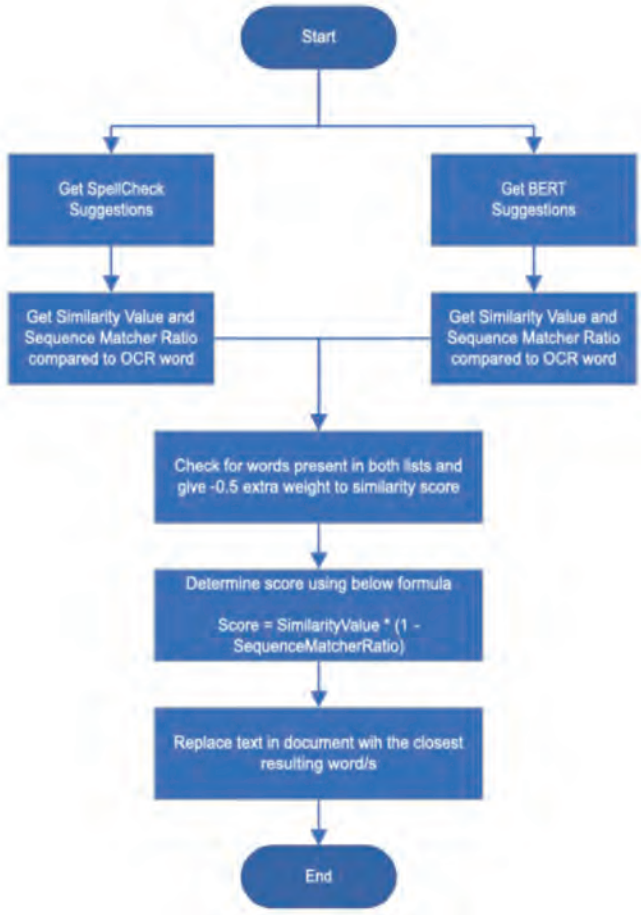

Fig 2 - Suggestions Algorithm Flowchart

Since the Bert model is not aware of any partial word that might be available in the un-masked text, its predictions in some cases might have no relation to the original word. As an example based on the results noted above, the invalid word was 'duil' however there is no close prediction from BERT. On the other hand if one has a look at the spell checker's recommendations, one will notice that they are all related to the invalid word:

```
['DUI', 'dual', 'duel', 'dull', 'Dial', 'dial', 'dill', 'duly', 'Dali', 'deli', 'daily', 'doily', 'dully', 'Del', 'til', 'Dell', 'Tull', 'deal', 'dell', 'doll', 'tail', 'toil']
```

This is where a new algorithm has been designed and developed that selects the closest word based on the result of both BERT and SpellCheck as well as the incorrect word that is being replaced. Two existing text matching algorithms were used as part of this process:

SequenceMatcher

SequenceMatcher is a class available in the python module called "difflib". It is able to compare a pair of sequences of washable elements, in this case characters, to find the longest match between them. This algorithm is similar to the 'gestalt pattern matching' algorithm published by Ratcliff and Obershelp in the late 1980's. (Python Software Foundation, n.d). It returns a Ratio that is in the range of 0 to 1, Where 1.0 is an identical word and 0.0 have nothing in common.

Document Similarity

This is originally used to find the similarity between two documents or a list of string/words. It is also an algorithm used by organisations and schools to check for plagiarism. Words are treated as vectors based on number of occurrences of words and the distance (dot product) between them is then calculated (Agarwal, 2020). I have repurposed this algorithm to instead calculate the similarity of words instead by checking characters rather than words.

First count the frequency of characters in each word

```
dull
D1 = {'d': 1, 'l': 2, 'u': 1}

duil
D2 = {'d': 1, 'i': 1, 'l': 1, 'u': 1}
```

Next the dot product is calculated and the angle in radians between the words' vectors can be found. Equation 1 gives the cosine similarity from which the angle in radians can be found.

The angle distance d represents Radians which ranges between 0 Rad (or 0°) for an exact match and 1.57 (π/2) Rad (or 90°) for no matching characters at all. This is what the new algorithm consists of:

1. Get SequenceMatcher ratio for each BERT prediction compared to invalid
word.
2. Get Similarity value for each BERT prediction compared to invalid word.
3. Get SequenceMatcher ratio for each SpellChecker suggestion compared to invalid word.
4. Get Similarity value for each Spell Checker suggestion compared to invalid word.
5. If a BERT prediction also exists as a SpellChecker suggestion, deduct 0.5 from its similarity score (this will be later used in equation 2) as a form of added weight so that the confidence of this result is raised, bringing it closer to 0. (Please note that the value of 0.5 was determined following a large number of trial and error until the best results were obtained).
6. Finally run this formula on all above predictions and suggestions (this formula was also a result of a large number of trial and error until the best results were obtained).

The word with the lowest score is then selected to be the replacement. In the above example, the word suggested by the SpellChecker, 'dull', has been successfully chosen with the resulting score value.

Results

Measuring Results to Original Text

For document result accuracy scoring, the same method as described in section 2.5 has been used. This time the plagiarism check as described by Agarwal (2020) has been applied in its original form; in that it is actually checking and comparing words within a given pair of strings. Below is an example of this calculation based on the comparison between the text "This is a geek" (D1) and "This was a geek thing" (D2). The similar words in both instances are "This a geek".

The dot product is calculated as follows

```
D1.D2 = "This"."This"+"is"."was"+"a"."a"+"geek"."geek"+"thing".0
D1.D2 = 1+0+1+1+0
D1.D2 = 3
```

Equation 1 can then be used to get the angle in radians between the vectors and get the difference in angle between them which are then converted to degrees.

Gathering Data for Analysis

The main data results gathered throughout the process contained rows per page that were processed. The columns saved consisted of:

- Page - the Page number,
- Changes Count - the number of word changes done on the page,
- OCR Similarity - the similarity score between the initial OCR process and the original text file,
- Final Similarity - the similarity score between the final OCR correction result and the original text file.

The improvement rate of change in similarity that is referred to throughout this journal is a calculation of FinalSimilarity – OCRSimilarity. Additionally, the below summary values are also a calculation based on the figures above.

- Totals - the total number of words that were changed within all processed pages together with a SUM of all OCR Similarity, FinalSimilarity and SimilarityChange scores.
- Average - the average similarity scores across all processed pages for OCRSimilarity and FinalSimilarity.
- Per-word - the total OCRSimilarity and FinalSimilarity amounts divided by the total of ChangesCount. These values can depict the change in similarity based on number of words that have been changed, and therefore allows for a normalised value across all processed pages.

Figure 3 shows a histogram rendition of the final results' in degree changes across all the pages. A right-skewed (or positively skewed) distribution can be clearly observed in the histogram in which the mode of the data or the highest peak is at (-1.01, -0.37).

The values are split into 3 groups, < 0 for the values that are negative, 0 for the values that remained the same at 0, and > 0 for positive values. It can therefore be observed that 61% pages have been improved, 17% remained the same while 23% of pages have decreased in similarity.

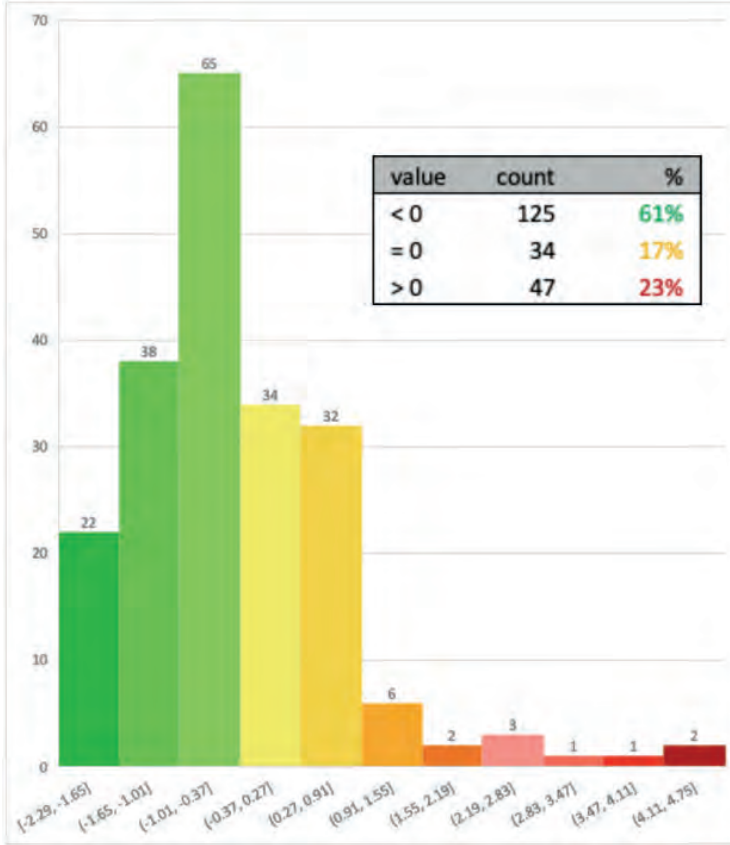

Fig 3 - Histogram of final degree changes in results.
Green (<0) shows improvement while Red (>0) shows deterioration

Sample of Improved Text

Below are a few sample examples of text that was recorded to be an improvement in accuracy. In some cases it can be seen that the exact words were not retrieved however the number of wrong words was decreased.

Actual: Isn't there ***a*** stream *somewhere* near here?
OCR: Isn't there **&** stream *somewhiere* near here?
Final: Isn't there **&** stream *somewhere* near here?

Actual: with which any Party intellectual *would* overthrow him in debate
OCR: with which any Party intellectual *wouid* overthrow him in debate
Final: with which any Party intellectual *would* overthrow him in debate

Actual: the subtle *arguments* which he would not be able to understand, much less answer
OCR: the subtle *arguments* which he would not be able to understand, much less answer
Final: the subtle *arguments* which he would not be able to understand, much less answer

Actual: And ***yet*** he was in the *right! **They*** were wrong *and he* was right
OCR: And he was in the *right!* were wrong *andhe* was right
Final: And he was in the *right* were wrong *and he* was right

Actual: true, hold on to *that!* The solid world exists, its laws do not change
OCR: true, hold on to *that!* The solid world exists, its laws do not change
Final: true, hold on to *that* The solid world exists, its laws do not change

Actual: Freedom is the *freedom* to say that two plus two make four
OCR: Freedom is the *freedoni* to say that two plus two make four
Final: Freedom is the *freedom* to say that two plus two make four

Analysing the Results

Across 206 pages of the sample document, 3180 words have been replaced in the process. The sum of Angular Separation (AS) before prediction amounts to 1504.01° and the sum of AS after amounts to 1432.39°. This amounts to an Angular Separation Ratio (ASR) of 4.76% (or a total decrease in AS of 71.62°). This is a considerable amount when seen as a total, however it must be noted that it is not quite accurate to report on this total amount since there is no way of attributing this AS amount to the actual resulting document. As was described before, 0° would mean a perfectly accurate document while 90° means a totally wrong. -2.29° was the best result that was achieved on any single page so an AS of -71.62° is almost irrelevant for this comparison.

To get a more tangible valuation of improvement, the average has been calculated instead. Here one can see that an average of 15.44 words have been changed per page and the average AS before prediction was 7.30° and 6.96° after prediction replaced the necessary words. This results in an average ASR of 4.66% (or a difference in AS of -0.34°) per processed page. This is a more accurate evaluation of the ASR, however there is one variable that still makes this not the most accurate analysis; that is the amount of words that have been changed in each page. The changed words range between 2 and 37 therefore the improvement rate for a whole page where 2 words were changed can't really be compared to a page in which 37 words have been changed.

For this reason, a third level in the analysis was added and that is a calculation per changed word. Here the Totals for the columns were taken and divided by the words changed. So the -71.62° total AS reported above has been divided by the 3180 total changed words resulting in each changed word having contributed an AS of -0.0225°, hence an improvement of 0.0225° per word. Therefore, since the distance before the process was of an average of 0.48° and after it got down to 0.45° it results in an average ASR of 6.25% per word processed. While it might not look like a big improvement it does mean that on the whole even though in some cases the accuracy decreased, on the whole the improvement is still significantly positive.

Discussion

In total 47 pages resulted in a total AS of 51.57° in error. With 721 word changes for these pages, this results in 0.0715° AS change per word which is considerable considering that the final degree change per word for the entire 206 page document was -0.0225°.

The 3 pages with the worst results had an AS change of 4.01°, 4.58°, 4.59°. This amounts to 51 words and a total of 13.17° which is almost 26% of all the negative scores. These 3 pages also make up just 6% of the negative score pages with 7% of changed words within the negative score pages collective. Looking at all the words that were changed in these pages, it resulted that a good number of these invalid results were actually correctly read through OCR however the spellchecker highlighted them as invalid words even though they were not.

An example of some of these words are:

DOUBLETHINK, grammes, Ingsoc, Oldspeak, Pre revolutionary, REDHAIRED, telescreen, UNGOOD, vaporized.

These words were found and replaced a total of 24 times in the worst 3 pages. The spellChecker by mistake saw these words as incorrect and therefore triggered the word prediction algorithm to have them changed. These words include words that the author might have made up or are not part of the standard dictionary used by the spellchecker. The word 'vaporized' for instance was replaced by the British English version 'vaporised'.

Apart from these the next common issue is where OCR combined 2 words together, this was found in 5 occurrences in the same 3-page sample ('moreiand' instead of 'more and', 'andithe' instead of 'and the' etc). These have all been replaced by one irrelevant word rather than having a whitespace added where necessary.

Conclusions

In this solution the language was set to be in English. The Spell Checker that has been used is able to spell check in a number of languages but cannot automatically detect the language. So there would be a workaround in the case that a document that requires processing that is in another language one would simply be required to manually set the language for it to use. This is not the same when it comes to the Google BERT model since this has been trained in English. Other BERT models in other languages do exist however it is not a case of changing a parameter. Having said that there was still the issue of American English versus British English. The book that was used in the samples shown throughout this documentation contains American English words like 'vaporized' that the SpellChecker saw as incorrect and the process changed it to the British English version of the word: 'Vaporised'. These in turn create false negatives in the corrections since the word was not incorrect to begin with and technically the resulting replacement is not incorrect either.

If one looks at the style, vocabulary and structure of sentences in a fictional thriller book it is very different than those within an actual Legal Document such as a leasing contract as an example. For this reason Google BERT will not always offer the suitable replacement words for all type of texts. Additionally in fictional works such as the sample used here might contain made up words or alternate words might be used within the alternate reality that the book is depicting. For a good example of this within the sample used here which is 1984 by George Orwell, one word which is incorrectly replaced within a large number of pages is the word 'Telescreen'. This is a fictional device that the author made up in the dystopian novel. Even though NLP was used to filter out words such as names, 'Telescreen' was not filtered out and was in fact in all occurrences within all pages replaced with the word 'screen' instead. This has also cause false negative results since the word was originally recognised correctly by the OCR.

As future improvements, an idea would certainly be to add the support for other languages both in the SpellChecker and more importantly as the BERT model used. A further idea would be to also automatically detect the language of the text being processed. This would eliminate the need for the user to manually select which language to use for processing. Apart from this, an additional idea to be added would be that of unsupervised learning. The concept for this one is to have the implementation of auto-learning where if a word is considered wrong too many times the system automatically adds it to an exceptions list. In the samples used in the previous chapters, this would for example be able to add the word 'Telescreen' to the exception/white list since it was detected as wrong a considerable number of times. It is very rare to have a type or damaged text that is read incorrectly with the same resulting string so many times.

To conclude, based on the results achieved above, we can say that results were improved with the use of spell checks, NLP and Google BERT model which are all non-OCR tools, and a positive amount of damaged text has been reconstructed by having the Google BERT model analyse the surrounding text and predicting the replacement words. When looking at it from a document indexing point of view, errors in connecting words like 'in', 'is', 'the' etc will not really affect the indexing accuracy but were included in the calculations within this study.

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Conflict of Interest

There is no report of any conflict of interest in this paper.

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02 Managing Life in the Face of Death

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Abstract

Objectives:
The study researched how professionals working in a long-term care facility are affected by death and dying of residents. Objectives included: identifying coping mechanisms, measuring stress, compassion fatigue, burnout, and compassion satisfaction; as well as assessing the impact of frequent contact with dying residents. The study also sought to identify strategies to improve the experience for staff, residents, and relatives.

Methods:
A mixed methods approach, through a quantitatively driven convergent design, was used. The study included quantitative and qualitative methods based on a post-positivist worldview. A self-administered survey was chosen as the data collection tool. The survey included the Perceived Stress Scale, the Professional Quality of Life Scale (Version 5) and open-ended questions. The questionnaire was distributed to all clinical professionals in scale 7 and above, working directly in the wards within a long-term care facility. Descriptive and inferential analysis were carried out on quantitative data, while thematic analysis was used for the open-ended answers. Data transformation was conducted to integrate the replies of the open-ended questions and statistically analyse them with the quantitative data.

Results:
The response rate was 56.7% of the total eligible population – 130 questionnaires were collected. 83.6% of professionals scored moderate in the Perceived Stress Scale, while 66.7% of the sample scored low on the Secondary Traumatic Stress Scale and 56.1% scored low on the Burnout Scale. 57.4% of the sample scored moderate and 40.7% of professionals scored high on the Compassion Satisfaction Scale. The satisfaction level was identified to be one of the reasons which helped professionals manage life in the face of death. Four themes emerged from the answers written by respondents to the four open-ended questions, namely, (1) facing the present, (2) methods of coping, (3) improving the experience and (4) reflective thoughts. There was statistically significant difference between self-perceived knowledge and burnout. Foreigners had lower levels of burnout and secondary traumatic stress which might be due to several influences, possibly culture differences, or contrasting training.

Conclusions:
Professionals within this facility found a balance between the level of satisfaction they experienced and the perceived stress, burnout, and secondary traumatic stress.

Keywords: "Dying and death", "Professionals", "Long-term care", "End-of-Life care", "Management".

Highlights:
- There was a statistically significant difference between self-perceived knowledge and burnout.
- From the data gathered it may be inferred that professionals' satisfaction level increases when doing their work well and offering a dignified death to residents.
- Foreigners had lower levels of burnout and secondary traumatic stress. This requires further investigation.
- Professionals working in this long-term care facility found different coping skills to help them take care of themselves. These coping skills together with the feeling of satisfaction are working well for these professionals to deal with their everyday work.

Introduction

Death is an inevitable part of life, eliciting varied emotional responses from those dying, their families, and surrounding individuals (Kostka, Borodzicz & Krzeminska, 2021). In long-term care facilities (LTCFs), the dying process impacts not only the residents, but also relatives and staff (Thompson et al., 2018). Professionals in LTCFs endeavour to provide holistic care to older persons, which could influence the professionals' well-being and work methods. While 91% of older individuals in LTCFs report a comfortable process of dying, issues like pain and distress are prevalent (Fleming et al., 2017). Quality of dying varies across regions, highlighting areas for improvement such as discomfort, difficulty in swallowing, and lack of serenity, peace, and calmness (Pivodic et al., 2018).

Dying involves significant changes in relationships and surroundings, with death carrying substantial values and meanings (Cable-Williams & Wilson, 2016; Fleming et al., 2017; Gonella et al., 2019; Thompson et al, 2018). Dying with dignity involves "human dignity" and "holistic care,". This requires addressing spiritual, cultural, emotional, and psychological aspects (Rafii & Abredari, 2023). Cultural considerations are key, particularly when caregivers and residents have different backgrounds (Clancy et al., 2021). Older persons emphasize the need for respect, participation, and maintaining dignity until the end of their life. Encouraging practical preparation for death can help, focusing on remaining abilities and addressing unresolved issues (Figueiredo, Ferreira & Assis, 2021). Moreover, relational dynamics and communication are important in providing dignified end-of-life (EOL) care (Pols, Pasveer & Willems, 2018).

Palliative and End-of-Life Care in LTCFs

Integration of Palliative Care (PC) with curative treatment benefits chronically ill older persons, emphasizing holistic assessment and personalized care (Pott et al. 2020). PC in LTCFs enhances comfort and quality of life, addressing physical, psychological, and spiritual needs (Gonella et al. 2019). Advance care planning (ACP) and advance directives facilitate discussions on care preferences, alleviating distress and ensuring respect for residents' wishes (Gonella et al., 2019). Involving families in ACP fosters better understanding and decision-making, reducing guilt and unnecessary interventions (Gonella et al., 2019). PC enables open discussions on care steps, focusing on resident comfort and holistic support, including spiritual aspects (Pott et al., 2020). It supports family caregivers in decision-making, enhancing patient-focused and family-centred care (Gonella et al., 2019). By integrating specialist PC, staff confidence and communication improve, allowing better planning for dying and death (Johnston et al., 2016).

Professionals often mirror their dignity in those they care for (Pols, Pasveer & Willems, 2018). Avoidance strategies by staff due to feelings of incompetence during the dying process can lead to undignified deaths (Puente-Fernandez et al., 2020). Being present at the bedside of dying residents is essential for comfort and emotional support (Thompson et al., 2018). For professionals, death is often perceived as a failure and discussing it remains a taboo (Figueiredo, Ferreira & Assis, 2021). However, the secrecy surrounding death in LTCFs often excludes residents from the reality of death, affecting their acceptance and processing of loss (Katz, Sidell & Komaromy, 2000). Relationships formed among residents are overlooked, with resources focused solely on the dying individual and their family (Katz, Sidell & Komaromy, 2001). Loneliness and loss of meaningful relationships are significant issues, with older residents expressing a need for new ties and genuine connections (Kitzmuller et al., 2018).

Healthcare workers in LTCFs often experience disenfranchised grief, as their personal loss is not acknowledged, and their grief deemed unacceptable (Wilson & Kirshbaum, 2011). Strong bonds formed with residents result in deep loss when they die. This is further exacerbated by the abrupt end of relationships with the deceased's family (Marcella & Kelley, 2015). Emotional expression around dying varies among facilities, with some discouraging it, with the risk of causing continuous distress for staff (Katz, Sidell & Komaromy, 2000; Marcella & Kelley, 2015). Support from managers and colleagues, along with the family metaphor, helps staff process grief while maintaining professional roles (Moss et al., 2003).

Effects of Dying and Death on Long-Term Care Professionals

Long-term care (LTC) professionals frequently encounter resident deaths, which they often consider part of their job (Marcella & Kelley, 2015). The strong bonds they form with residents intensify the distress experienced when residents die (Figueiredo et al., 2021; Katz et al., 2000). Polish nurses, for example, in particular those with few professional experience, reported increased anxiety and depression related to patient deaths (Kostka et al., 2021). Emotions such as compassion, sadness, and helplessness are common, whereas anger and indifference feature less (Kostka et al., 2021). Professionals working with dying individuals often face burnout and compassion fatigue, though they also experience compassion satisfaction from helping others (Oliver et al., 2021; Sanso et al., 2015; Shahar et al., 2019). High stress levels among nurses were evident, with 53.9% experiencing high stress (Kostka et al., 2021). Factors contributing to stress include workload, schedules, and lack of training, particularly among junior doctors and nurses (Bharmal et al., 2019; Puente-Fernandes et al., 2020; Islam et al.,2017).

Coping Strategies

To manage the emotional toll, LTC professionals employ various coping strategies. These include self-care, humour, forming relationships, and seeking support (Marcella & Kelley, 2015). Spirituality and religion, though less common, are also used (Kostka et al., 2021). Training in end-of-life care (EOL) and promoting holistic self-care are key for improving quality of life and reducing burnout (Oliver et al., 2021; Sanso et al., 2015). However, specific training alone may not be sufficient (Sanso et al., 2015). Support from the organization and peers is required. Providing a space for reflection, mentoring, and peer support helps staff manage grief and maintain resilience (Pott et al., 2020; Smith-MacDonald et al., 2019; Wilson & Kirshbaum, 2011). Policies to support staff after a resident's death can prevent unresolved grief and improve overall job satisfaction (Marcella & Kelley, 2015). Informal support networks among colleagues play a significant role in coping with stress (Kostka et al., 2021). Acknowledging and commemorating resident deaths aids staff process their grief. Activities like memory trees or services can provide closure and reduce noxious emotions (Marcella & Kelley, 2015; Pott et al., 2020). The struggle with unresolved grief may impact the staff's well-being and job performance if they are not supported (Pott et al., 2020). Furthermore, managers in elderly care facilities face ethical challenges, such as balancing care needs with resource constraints. Reflective practices among staff and managers can help address these challenges and improve care quality (Jonasson et al., 2019).

Aim and Objectives

This study aimed to understand the effects of managing death on professionals at St Vincent de Paul Long-Term Care Facility (SVP).

Objectives included:

a. measuring stress, compassion fatigue, burnout, and compassion satisfaction.
b. assessing the impact of frequent contact with dying residents.
c. identifying strategies to improve the experience for staff, residents, and relatives.
d. identifying coping mechanisms.

Methodology

A post-positivist worldview with a mixed methods design was adopted for this study, utilizing a quantitatively driven convergent design (QUAN+qual). This approach was chosen to explore the statistical relationships between variables and to understand the current management of dying and death among residents by professionals, and how it influences their daily work (Schoonenboom & Johnson 2017).

Sample

SVP was chosen as the study site because it is the largest LTCF in Malta, dealing with residents of the highest frailty, thus frequently encountering challenges related to dying and death. The study focused on experienced clinical professionals (pay scale 7 and above) who have a clinic role with residents. These included medical doctors, nursing, and allied health professionals (occupational therapists, physiotherapists, speech language pathologists, and social workers). The pay scale criterion ensured the selection of experienced professionals who manage their own clinical work and make clinical decisions. All the population reaching the inclusion criteria was included.

Recruitment and Data Collection

The number of eligible persons in each section was inquired and key persons in every section were approached to act as gatekeepers. The sampling depended on each individual participating since all eligible participants were approached. The sample identified as eligible was of 194 professionals, consisting of 143 nurses, 24 doctors, and 27 allied health professionals. A target was set, based on a population of 194 and a confidence level of 95% which was to be considered for the sample. After obtaining ethical clearance, copies of the questionnaire were distributed accordingly to eligible professionals through gatekeepers. Participants were asked, through the covering letter, to return the completed questionnaires to the same gatekeeper. After two weeks, a person assisting the researcher phoned all gatekeepers to inquire regarding the filled questionnaires and arrangements were made to collect them.

Theoretical and Conceptual Frameworks

Kearney and Weininger's Self-Awareness-Based Model of Self-Care emphasizes the importance of self-awareness for clinicians to avoid burnout and foster healing connections (Kearney & Weininger, 2011). Sanso et al. (2015) expanded this model, linking self-care and awareness with compassion satisfaction and reduced burnout. This holistic approach integrates necessary skills, self-awareness, and coping strategies to enhance professional effectiveness and satisfaction.

The model by Sanso et al. (2015) was used to conceptually integrate the quantitative and qualitative data. For this study, specific training referred to self-perceived knowledge and protocols that provide better understanding of the skills needed. Self-care included all activities exercised consciously to take care of oneself. Finally, awareness was based on Mount, Boston and Cohen's (2007) framework of being aware of self, of others, of the environment, and of the ultimate meaning.

Perceived stress level was another component which was collected within this study. This was deemed necessary to quantify, due to the higher levels of stress reported in the literature amongst staff working in LTC homes (Islam et al, 2017). Therefore, adaptations to the model included the addition of Perceived Stress. The original model by Kearney and Weininger (2011) used compassion fatigue as synonymous with secondary traumatic stress. This synonymous usage was followed in this study. Figure 1 shows the adapted model, as used in this research.

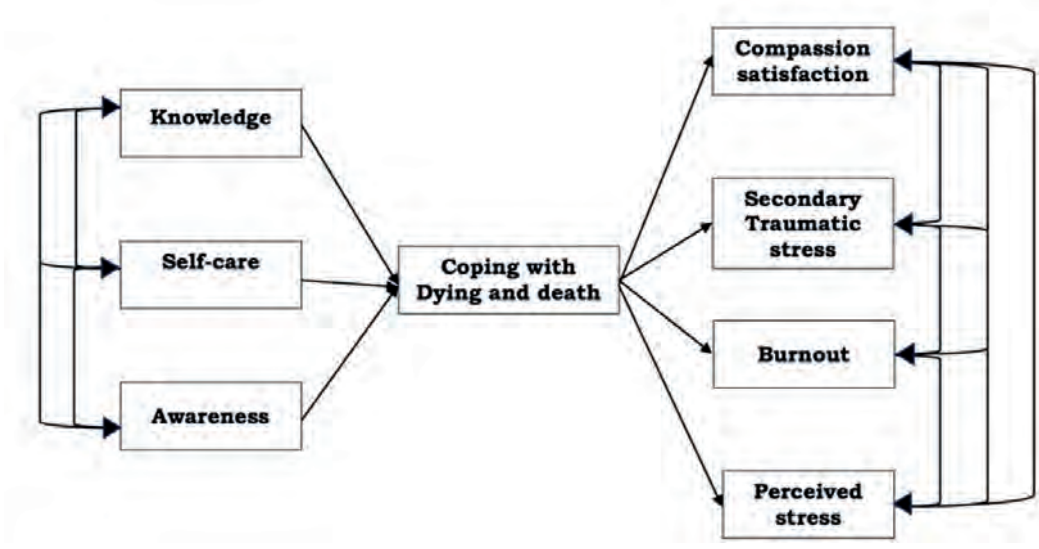

Figure 1: Model used for research (Adapted from Sanso et al., 2015)

Research Tools
A self-administered questionnaire with four parts was used. The first part included eleven descriptive questions providing demographic information. The second part of the questionnaire was the Perceived Stress Scale (PSS), utilizing a five-point Likert scale to gauge stress levels over the past month (Cohen, Kamarck & Mermelstein 1983). The PSS-10 was selected for its superior psychometric properties and reliability compared to PSS-14 (Lee 2012). The third section included the Professional Quality of Life Scale (ProQOL) Version 5, which measures secondary traumatic stress, burnout, and compassion satisfaction through thirty statements rated on a five-point Likert scale (Hudnall Stamm 2009–2012). Despite validity concerns, particularly because no goodness-of-fit could be demonstrated on different indices (McClure 2022) due to the use of Confirmatory Factor Analysis, ProQOL was chosen for its extensive use and reliable measures. The final part consisted of four open-ended questions to explore participants' perceptions on managing dying and death, coping strategies, and any supplementary material. This qualitative data aimed to complement the quantitative findings.

Data Analysis
Data from the questionnaire was collated in an Excel sheet. Data was then transferred to SPSS version 27 for descriptive and inferential statistical analysis. Descriptive analysis included frequencies, percentiles, central tendencies, and standard scores. Tests of normality determined whether variables were parametric or non-parametric. Inferential statistical tests were conducted to understand relationships between variables.

Content analysis through the Model described above was carried out for the open-ended questions by recording the frequency of each respondent under the themes of knowledge, self-care, awareness, and perceived stress. Data transformation was carried out, where the qualitative data was transformed to numeric counts and thus integrated into the same database containing the quantitative data (Fetters, Curry & Creswell, 2013). Chi-square tests for categorical data and T-tests and ANOVA for continuous variables were applied. Qualitative data was also analysed using reflexive thematic analysis. Together with the use of Clarke & Braun's six-phase model (Clarke & Braun 2013), this analysis identified patterns and meanings within the data (Finlay 2021).. Winnowing highlighted the most important qualitative data (Creswell & Creswell 2023). Integration of qualitative and quantitative results provided robust outcomes through the mixed methods approach.

Ethical Considerations
Permission was obtained from the Idea College's ethics board (IRBE), SVP's data protection officer, and senior management teams of the public and private sectors of SVP. Gatekeepers maintained participants' anonymity. The questionnaire was anonymous and voluntary, with completion considered as consent.

Results

Descriptive Analysis
The total number of collected questionnaires was of 130. The response rate was 56.7% of the total eligible population. The highest number of participants was from the nursing profession (71%). This accounts for 55% of the cohort eligible to reply. The least number of replies was recorded among the medical doctors, from which 46% of the cohort filled in the questionnaire. These made up 10% of the respondents. The allied professionals in the study, including occupational therapists, physiotherapists, speech language pathologists, podiatrists, and social workers, made up 19% of the respondents, which covered 78% of the eligible cohort. All demographic information, divided by gender, may be viewed in Table 1.

		Male (% of total)	Female (% of total)
Age	20-30	9.8	15.3
	31-40	21.6	40.7
	41-50	21.6	13.6
	50+	47.1	30.5
	Total	100	100
Nationality	Maltese	88.2	88.1
	foreign	11.8	11.9
	Total	100	100
Profession	medical	5.9	13.6
	nursing	82.4	61.0
	allied	11.8	25.4
	Total	100	100
Ward	fixed	92.2	88.1
	reliever	7.8	11.9
	Total	100	100
Place of work	dementia	17.6	13.6
	male	21.6	1.7
	female	9.8	22.0
	mixed	25.5	37.3
	combination	25.5	25.4
	Total	100	100
Dying patients	never	11.8	6.8
	less than 5	33.3	25.4
	6-10	25.5	27.1
	11-20	2.0	11.9
	20-30	11.8	5.1
	30+	15.7	23.7
	Total	100	100
Training	yes	45.1	37.3
	no	54.9	62.7
	Total	100	100
Scale	7	47.1	54.2
	6	43.1	40.7
	5	5.9	3.4
	4	3.9	1.7
	Total	100	100

Table 1: Demographic information divided by gender

38% of the population under study was above the age of 50 years, with only 12% of the population being under 30 years of age. Regarding gender, the respondents of the study identified themselves as 46.4% male and 56.6% female. 11.8% of the respondents were foreigners and these were from the nursing profession. Regarding the number of years working at SVP, 33.9% of the professionals had been working for less than 5 years at SVP, 25.5% worked between 11 and 21 years at SVP, while 12.8% had been working at SVP for more than 30 years. A small proportion of the respondents had no fixed ward (relievers), with the rest having fixed wards.

9.1% of the population never encountered a dying resident during the past year and 29.1% had less than five contacts with dying residents. 26.4% of professionals encountered six to ten dying residents, while 15.5% were within the bracket of eleven to thirty residents. 20% of respondents reported having contact with more than thirty dying residents. 59.1% reported that they had no specific training on how to discuss EOL issues with residents and relatives in their undergraduate studies.

For the PSS (n=110), 83.6% scored moderate, 11.8% scored low, and 4.6% scored high. For the CSS, 1.9% scored low, while 57.4% scored moderate, and 40.7% (n=108) scored high compassion satisfaction levels. None of the participants scored high on the BS, 56.1% scored low, while the remaining 43.9% (n=106) scored moderate. 66.7% of professionals scored low on the STSS, 33.3% scored moderate, while no one scored high. An overview of the mean and standard deviation of the different scores according to the different variables may be viewed in Table 2.

		PSS		CSS		BS		STSS	
Demographic		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	20-30	18	5	36	7	23	7	19	5
	21-40	19	5	40	7	22	6	21	5
	41-50	18	5	40	5	21	6	19	5
	51+	18	4	40	6	22	5	22	6
Gender	Male	18	4	38	7	22	6	20	5
	Female	19	5	40	5	22	5	21	6
Nationality	Maltese	18	5	39	6	23	6	21	5
	Foreign	18	3	44	4	18	4	20	5
Profession	Medical	19	4	40	4	22	5	20	5
	Nursing	18	4	40	6	22	6	21	6
	Allied	18	6	37	8	23	5	20	5
Place of work	Dementia	20	4	39	6	24	6	21	7
	Male	17	4	38	8	22	5	21	5
	Female	18	4	40	5	22	4	22	5
	Mixed	19	5	38	7	22	7	21	5
	Combination	18	4	40	5	21	5	20	5
Training	Yes	18	4	42	5	20	5	20	6
	No	19	5	38	7	24	5	21	5
Dying residents	Never	18	4	35	8	23	6	20	5
	<5	17	4	41	6	20	4	20	6
	6-10	19	4	38	6	24	6	20	5
	11-20	18	4	33	6	23	4	24	5
	21-30	18	4	39	9	20	6	18	5
	31+	20	5	40	5	23	6	23	6

Table 2: Overview of mean and SD of scores according to different variables

Data normality tests

The Shapiro-Wilk test was used to check the normal distribution of continuous data. CSS and STSS were found not to be normally distributed. PSS and BS were found to be normally distributed.

Correlation analysis and Inferential statistics

There was no statistical significance between the scores from PSS, BS, and STSS with gender (using the t-test) and profession (using ANOVA). However, there was a statistical significance between BS and nationality (p=0.004). There was a statistical significance (p=0.002) between training and BS. The correlation between CSS and the years of service was p=0.052, while that between CSS and the number of dying residents was p=0.055. There was no statistical significance between the scores and years of working at SVP, as well as no statistical significance with the ward the professional works in.

Pearson's Correlation tests were performed between the different standardised scales. There was a statistically significant correlation between PSS and BS, between PSS and STSS, between CSS and BS, as well as BS and STSS. There was no statistically significant difference using chi-square test when using the transformed data with gender, nationality, training, and working in fixed ward or as a reliever. However, there was a statistically significant difference between the transformed data for awareness and the CSS, and a statistical significance for the BS when using the Mann-Whitney U test.

Thematic analysis results

Four themes emerged from the replies to the open-ended questions: (i) facing the present experience, (ii) ways of coping, (iii) improving the experience, and (iv) reflective thoughts (Table 3).

Effect of Managing death and dying on Healthcare Professionals (HCPs)		
Themes	**Subthemes**	**Quotes**
I. Facing the present	- Part of the job	*"normal procedure; everyone knows that here is the final stage... soon an empty bed is to be filled again. Thus, a new assessment and the story starts once again."*
	- Taking the extra step	*"Last year a new experience was when I helped the wife of a dying resident and also their sons, to play Elvis's music which the patient really liked to play, and also the wife groomed her husband and put on his shrouding clothes when he died as music continued in his journey."*
	- Difficulties along the way	*"dying and death become part of my job, although the death of a resident is always a difficult moment especially here that most of the residents become part of us".*
II. Methods of coping	- Protecting self	*"Just be grateful for the gift of life, the experiences we make and the opportunity to taste what life is. Making sure to remind oneself that no one will stay forever, and that death is inevitable. Inhale... exhale and life must go on".*
	Keeping a balance - Making sense	*"by taking care of myself through my hobbies and quality time with family".*
		"Everyone needs to die, personally I see dying as a milestone, and meeting our creator".
III. Improving the experience	- Creating space for death - The holistic approach	*"to recognise that someone is dying".* *"to be compassionate, supportive and ready to answer any questions requested by relatives".*
	- Being equipped	*"I feel the need to be more informed on how to handle challenging situations and to be of support to both residents and relatives".*
IV. Reflective thoughts	- Embracing reality	*"If we human beings accept death as part of our life, then we may appreciate much more the short lifespan we get to live. Instead of shunning death,*
	- Putting into perspective	*we should all be appreciative of it as the natural end to a life 'well lived'."*
		"At times I feel death actually is a good thing as the patients would be suffering too much. It is the suffering process that causes most turmoil, not the death itself. There is a dignity in death."
	- When facing death	*"Thinking about end-of-life and death (and working in this environment) has invigorated me towards life. I can very closely say that I am quite at peace with death and dying... we are all going to die one day – it's a matter of when and how this will happen. That's why I try to live life to the full (SVP residents taught me this)."*

Table 3: Overview of themes and subthemes

Explanation of Themes

Theme 1: Facing the Present. Professionals managing death and dying express a sense of routine and expertise in their work, accompanied by a desire to improve within the constraints they face. They emphasise the importance of communication and collaboration within the multidisciplinary team, including the chaplaincy, continuous monitoring, and ensuring that the dying resident is comfortable and pain-free. Involving relatives during the end-of-life (EOL) stage was identified as crucial. Professionals noted the necessity of being a reassuring presence for residents and their families, listening attentively to residents' needs, and managing the humane aspects of dying. This included addressing the emotions of other residents, relatives, and junior staff, and handling practical aspects related to funerals and expected procedures.

Theme 2: Methods of Coping. Various coping strategies emerged among professionals, ranging from emotional detachment and boundary-setting to practical methods and seeking help. Some professionals detached themselves emotionally, while others allowed themselves time to process and move on. Work-life balance was essential, with activities like exercise, relaxation, socializing, and hobbies serving as coping mechanisms. Others preferred private coping rituals, such as prayer, meditation, self-reflection, or engaging with the resident or relatives. Satisfaction from performing one's duty and helping residents die comfortably was another coping strategy. Sharing experiences with colleagues, professionals, or friends helped some cope with the emotional toll of death and dying.

Theme 3: Improving the Experience. Professionals suggested that the LTCF should aim for excellence in palliative care at EOL, including care for relatives. Regular follow-up and involvement of relatives were highly appreciated by both residents and their families and should become standard practice across the entity. Improving the environment by providing private spaces for EOL care was recommended to offer more privacy and a calmer atmosphere, where relatives can receive psychological or spiritual support. Professionals emphasise the need for education and training in palliative care and EOL management for all care providers. Support from seniors, colleagues, families, and professional help was deemed necessary. Some suggested workshops on death and dying to facilitate mutual learning and address loss.

Theme 4: Reflective Thoughts. Philosophical reflections on dying and death revealed the complexity and emotional challenges posed to professionals. Despite experience potentially leading to numbness and routine, facing death remained difficult, with sudden deaths identified as being particularly challenging to accept.

Professionals encountered diverse reactions and grieving processes from relatives, adding to the emotional burden alongside their own feelings. Some saw death as an integral part of their job and welcomed it when it alleviates the resident's suffering. It was expected that those working closely with death possess strong character and a compassionate heart.

Discussion

General Findings

This study aimed to understand the effects of managing death on professionals at St Vincent de Paul Long-Term Care Facility (SVP). The study analysed the experiences and satisfaction levels of professionals working in a LTCF with respect to EOL care. The distribution of respondents was representative of the broader population, ensuring diverse insights. Psychological measures such as the Perceived Stress Scale (PSS), Burnout Scale (BS), Secondary Traumatic Stress Scale (STSS), and Compassion Satisfaction Scale (CSS) revealed a satisfactory level of professional fulfilment, similar to findings among Greek healthcare professionals during the Covid-19 pandemic. This balance of stress and satisfaction stems from the exhaustion of workload and the intrinsic reward of aiding those in need. No significant correlation was found between the duration of service and levels of perceived stress (PSS), burnout (BS), and secondary traumatic stress (STSS). However, CSS showed a significant relationship with the number of residents' deaths, aligning with Kostka Borodzicz and Krzeminska's (2021) findings on the workplace's impact on nurses' stress levels. Most professionals scored moderately on the PSS, lower than Israeli nurses in acute settings, possibly due to the less intense pressure in LTCF environments.

Open-ended responses indicated that acclimatization to death might explain lower stress levels, as professionals balanced stress with compassion satisfaction, finding peace in fulfilling their roles well. Interestingly, foreign professionals reported lower burnout and secondary traumatic stress levels, possibly due to cultural differences or distance from personal support systems. A notable finding was the significant lack of EOL training among professionals, echoing studies by Bharmal et al. (2019), Puente-Fernandez et al. (2020), and Figueiredo Ferreira and Assis (2021). This deficiency might result in unawareness of gaps in care, leading to perceived higher job satisfaction and lower stress levels, similar to Islam et al.'s (2017) conclusions on less-trained staff experiencing greater satisfaction.

Facing the Present Experience

Professionals seem to accept death as part of life, but still grappled with grief. This study highlighted their efforts to provide dignified care, which sustained their job satisfaction, resonating with Pott et al.'s (2020) acknowledgment of resilience among LTCF staff. However, if this is not achieved due to lack of time and resources, it can lead to frustration and burnout (Smith-MacDonald et al., 2019; Fleming et al., 2017). The importance of advanced care planning and supporting relatives during residents' dying phases was emphasized by the participants. This can provide the staff with a plan of how to deal with such challenging situations. It would also help professionals' commitment to granting last wishes and offering comfort.

Participants expressed concern that this was not always appreciated by management, as Thompson et al. (2018) noted. The emotional labour involved in caring for both the dying and their relatives, together with other residents, was echoed by Kitzmüller et al.'s (2018), highlighting the importance of supporting existing relationships. Professionals faced challenges from staff shortages and differing views on treatment plans. The difficulty of accepting unexpected deaths and managing family dynamics added to their stress, as corroborated by Kostka Borodzicz and Krzeminska (2021) and Figueiredo Ferreira and Assis (2021). Emotional resilience, as suggested by Thompson et al. (2018), was crucial for enduring the emotional toll.

Ways of Coping

Coping mechanisms varied, with some professionals becoming desensitised to death, akin to Moss et al.'s (2003) observations of callousness. Others needed closure and sought solace in performing their duties well, finding relief in self-care, and reminiscing about positive memories with residents, as recommended by Sanso et al. (2015) and Marcella and Kelley (2015). Spirituality played a significant role, providing comfort and aiding in managing grief, as supported by Thompson et al. (2018) and Kostka Borodzicz and Krzeminska (2021). Seeking support from colleagues, family, and friends was another common strategy, emphasizing the need for psychological and spiritual care integration to bolster emotional resilience, as highlighted by Marcella and Kelley (2015) and Puente-Fernandez et al. (2020). Participants used a variety of coping mechanisms based on their preferences, as shown by the diversity of coping mechanisms mentioned in the literature.

Improving the Experience

The professionals felt that EOL care in LTCFs needed improvement. Suggestions included extending advanced care planning, introducing bereavement care for relatives, and providing private, calm spaces for dying residents, resonating with Driessen, Borgstrom, and Cohn (2021). Training on EOL care, palliative care, and communication of bad news was deemed essential to address the current gaps, echoing Puente-Fernandez et al's (2020) conclusions. A holistic approach involving family members and addressing the emotional and spiritual needs of professionals and relatives was recommended to enhance the quality of EOL care. This holistic view aligns with Gonella et al.'s (2019) and Figueiredo Ferreira and Assis' (2021) discussions on comprehensive care approaches.

Reflective Thoughts

Professionals' reflections on death varied, with many seeing it as a relief from suffering, but struggled with unexpected or premature deaths. Acceptance was easier when death followed a well-lived life, as noted by Puente-Fernandez et al. (2020). Ethical dilemmas often arose, causing moral distress, especially when professional responsibilities conflicted with policies, as discussed by Jonasson, Sandman, and Bremer (2019). Maintaining a compassionate heart while developing a strong character was crucial for providing quality care, resonating with Smith-MacDonald et al. (2019). The metaphor of being like family helped professionals cope with grief, allowing space for emotional expression while prioritizing residents' families, as Moss et al. (2003) explained. Ultimately, self-care and resilience were vital for professionals to manage their work effectively, reflecting Pott et al.'s (2020) emphasis on the importance of self-care for resilience.

Inference of results

There was a statistically significant difference between self-perceived knowledge and burnout. It seems that the more the professional knows, the more burnout is possible. From the data gathered it may be inferred that professionals' satisfaction level increases when doing their work well and offering a dignified death to residents. Thus, burnout may be controlled with satisfaction levels and awareness. Foreigners had lower levels of BO and STSS which might be due to several influences, possibly culture differences, or different training.

Strengths and Limitations

The primary strength of this study was that, to the knowledge of the researcher, it is the first study that looked at the local scenario to study the effect of death and dying on professionals working in a LTCF. The use of a mixed methods design strengthens the study, in that the results of one method could reinforce or challenge the ideas resulting from the other.

One of the major limitations of the study was the time factor, which limited the possibility of having focus groups to delve deeper into the topics generated through the responses to the open-ended questions. Thus, the qualitative part was limited as the researcher was unable to expand and further explore the participants' responses. This was compensated for by good turnout of filled-in questionnaires, providing a good overview of the professionals' views. Other possible limitations of the questionnaire's responses were the bias of the researcher, as well as the possibility of the healthy worker effect.

Conclusions

It seems that professionals working at SVP found different coping skills to help them take care of themselves. These self-help skills ranged from physical exercise to taking time alone or talking to family members and friends. Coping strategies, together with the feeling of satisfaction from working well, helped professionals deal with their everyday work. This was shown through the scores obtained in the PSS, BS, and STSS.

Professionals viewed death as a potentially positive experience which relieved the older person from pain. This was given a spiritual interpretation, through the beginning of a new reality, by some participants. Residents' death helped the professionals to appreciate their life and to live it to the full. Professionals managed death and dying in their daily work by accepting that death is part of the life cycle. Moreover, the motivation of doing their utmost to offer a peaceful death to residents and offering their support to the relatives, helped participants increase their level of satisfaction, while decreasing the effect of burnout, secondary traumatic stress, and perceived stress.

The high level of satisfaction in their work managed to balance the difficulties met and decrease the possible perceived stress, burnout, and secondary traumatic stress. However, more psychological and spiritual support should be provided to maintain a healthy balance. Being moderately stressed might be difficult to cope with if it is experienced for a long period of time.

Recommendations

Further research to explore the topics generated through this study, such as the difference which led to different scores on BS and STSS between foreign and local professionals, is highly recommended. Also, research needs to delve into the impact of dying and death on carers working in long-term care facilities, since these spend more time with residents.

Recommendations for practice include having a bereavement room and a psychologist, not only for residents, but also for relatives and staff. Finally, recommendations for training on topics such as, end-of-life care, palliative care, sharing of bad news, dealing with difficult situations, and handling persons in their grief and other emotions.

Conflict of Interest

The author confirms that she was an employee within the facility when carrying the study. However, there was no conflict of interest from the entity into carrying out the study.

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03 Application of the Balanced Scorecard to Scout Groups: A Parents' Perspective

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Abstract

Objectives: The aim of the study was to evaluate the performance of Scout Groups within The Scout Association of Malta (TSAM) and to determine whether Scout member's satisfaction is affected by financial and non-financial dimensions. To reach the aim of the study, a complementary objective was set: the evaluation of the demand side from a parents' perspective.

Methods: A sequential multiple research method was used, with quantitative research as the main method. With a review of the literature and previous secondary research, qualitative research was carried out to create a triangulation to determine the Key Result Areas (KRAs) for the Balanced Scorecard (BSC). Subsequent quantitative research using questionnaires, was conducted based on the derived KRAs to reach the research objectives.

Results: The study concludes that Scout Groups in Malta are performing well and Scout Members are satisfied.
Results show that:

- The overall performance of Scout Members is 84%.
- The overall performance of Scout Leaders is 93%.
- The overall performance of the Internal Processes is 88%.
- The overall Group's Financial performance is 80%.
- Scout Member's satisfaction has been rated as 89%.

Conclusion: The study shows that in non-profit organisations, such as TSAM, Scout Member's satisfaction does not depend on the financial situation of the organisation. Consequently, this study proves that Scout Member's satisfaction depends on the performance of the Scout Member, the performance of the Scout Member's leader and the internal processes involved within the group and TSAM.

Keywords: "Performance Measurement", "Balanced Scorecard", "Scout Groups", "Strategic Management", "Non-Profit Organisations".

Graphical Abstract - The Relationship between Variables

Keywords:

- Scout Members are highly satisfied with their Scouting experience.
- The overall performance of the Scout Members, the Scouters and the internal processes statistically correlate with the Scout Members' satisfaction.
- Scout Members' satisfaction is not affected by the group's Finance matters.
- Scout groups' performance is highest in the Employee (leader)'s dimension and is lowest in the Financial dimension.

Abbreviations:

BSC	Balanced Scorecard
GSL	Group Scout Leader
KPI	Key Performance Indicator
KRA	Key Result Area
TSAM	The Scout Association of Malta

Introduction

"In the modern world, life has become too complex to be led by academic qualifications alone" and consequently there are other factors "which help in shaping the life" of the young generation (Ravi & Shetty, 2020, p. 1476). These factors emerge from extracurricular activities which enable children and youths to interact outside academic environments. This is affirmed by various research concluding that extracurricular participants are more positive towards education, are more academically successful and have higher self-esteem than those who are not involved in extracurricular activities (Ginosyan et al., 2020). Consequently, promoting participation in extracurricular activities offered by approved organisations, including voluntary and non-voluntary organisations has always been on the agenda of the Government of Malta (Government of Malta, 2020). Amongst the various organisations, there is TSAM, which is "one of the largest youth organisations in Malta" (The Scout Association of Malta, 2023a).

"Scouting is a global youth Movement that builds friendships, experiences, and skills for life, shaping young people's futures as active citizens" (World Organization of the Scout Movement, 2023). Thus, Scouting can be the key to a better future. Evaluating the performance of Scout Groups within TSAM is essential to identify areas for improvement through achievable targets and initiatives. As a result, this study aimed to evaluate the performance of Scout Groups and determine whether Scout member's satisfaction is affected by financial and non-financial dimensions. In addition, to reach the aim of the study, two complementary research questions were set:

1.From a parents' perspective, are Scout Groups performing well?
2.How satisfied are young Scout Members?

In response to the research questions, four sets of hypotheses were formulated to be confirmed or disproved subsequent to the research process. The aim of the sets of research hypotheses was to investigate whether or not Scout Member's performance correlates with the overall performance of the Scout Members, Scouters (Scout Leaders), Internal Processes and Group's Financial Matters.

To evaluate performance, the BSC which was introduced by Kaplan & Norton (1992) was applied to Scout Groups as it is the only performance measurement and management tool that considers four distinct but related dimensions: Customer, Learning and Growth (Employee), Internal Business Process and Finance. Being multi-dimensional, the BSC helps management identify those areas which need to be improved and subsequently set objectives for improvement (Kaplan & Norton, 1992). Moreover, the BSC can be applied to all organizations irrespective of whether they are profit-making or non-profit-making (Niven, 2003) and irrespective of whether they are offering a good or service (Quintano, 2016), thus making the BSC as the ideal performance evaluation tool for Scout Groups.

Methodology

This study was framed within the positivist philosophy which is based on facts "gained through observation, including measurement" and thus focuses on numerical data (Dudovskiy, 2023). This meant taking a descriptive approach "as the major purpose is the definition of the state of affairs existing at the time of the survey" (Quintano, 2016, p. 39), thus revealing facts.

The point of departure for the research journey was the formulation of the research questions and the development of a conceptual framework consisting of the variables that affect the Scout Members' satisfaction as shown in Figure 1.

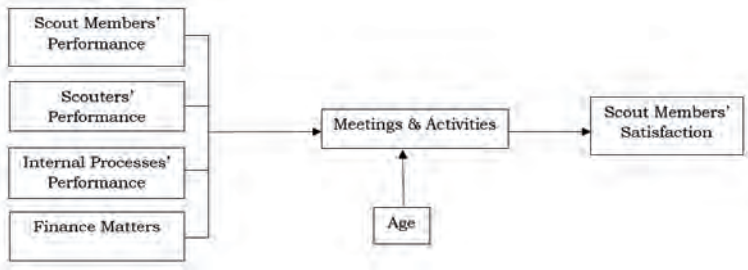

Figure 1: Conceptual Framework

Together with the literature review and previous secondary data, qualitative research was conducted by interviewing 7 Group Scout Leaders (GSLs) to determine the KRAs and subsequently develop the Key Performance Indicators (KPIs) for the BSC. In operations research methodology, this is referred to as the 'elicitation' process (Quintano, 2016). The selected 16 KRAs were then framed within the four perspectives of the BSC as shown in Figure 2 and placed in a hierarchy with the upper level denoting the four perspectives of the BSC and a lower-level hierarchy denoting the 16 elicited criteria.

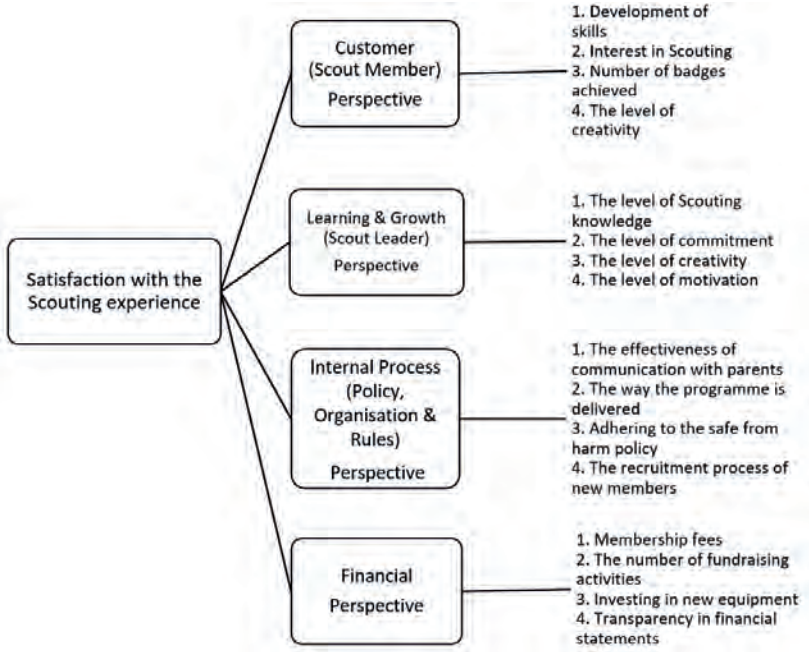

Figure 2: Hierarchy of KRAs within the BSC Framework

Based on the derived KRAs from the qualitative research, quantitative research was conducted using an online questionnaire which was self-administered by 546 Scout Members' parents[1]. The questionnaire consisted of seven sections. The first section consisted of an introductory note and a consent declaration. The second section targeted the demographic profile of the members consisting of the child's gender, in which section the child is enrolled and the territorial district. The next four sections were related to the four dimensions of the BSC, inclusive of questions related to the KRAs elicited from the interviews. In most of the questions, the respondents were asked to give a rating from 1 to 9, 1 being the lowest rating and 9 being the highest rating. The Likert scale was deemed to be the most suitable method for rating due to its "simplicity and popularity" (Chyung et al., 2017, p. 15).

Additionally, the questionnaire concluded with Section 7 in which the respondents had the option to add any other feedback which they deemed to be relevant for the study.

Ethical considerations

While conducting the research, "the fundamentals of ethical research" were adhered to, to ensure confidentiality, anonymity and no harm (Fleming & Zegwaard , 2018, p. 209). All participants were provided with an introductory note explaining the purpose of this study and were asked to declare their consent. This ensured voluntary participation, and all participants were free to withdraw their participation in this research at any time without having to provide any reason. Furthermore, no minors were asked to participate in this study to avoid the need for further ethics approvals and parental consent (FRA, 2014).

1 Gathering information from members as young as five years old was considered to be challenging. Additionally, to enrol in a Scout Group and attend activities, applicants under 18 years of age are required to have their guardians' consent. Consequently, parents are the decision-makers and are continuously aware of what is happening, thus making their feedback valuable.

In addition, this study has been approved by the ethics committee of Idea College and by the Chief Scout and Chief Commissioner of TSAM.

Results

Prior to the presentation of findings, it is essential to perform tests to ensure that the data gathered is valid and reliable. Thus, the Pearson Product Moment Correlation test (Table 1) and the Cronbach's Alpha test (Table 2) were conducted which confirmed the validity and reliability of the Likert-scale questions' responses.

		Total
A1 how do you rate the development of skills in your child?	Pearson Correlation	.543
	Sig. (2-tailed)	<.001
	N	546
A2 how do you rate the interest in scouting of your child?	Pearson Correlation	.528
	Sig. (2-tailed)	<.001
	N	546
A3 how do you rate the progress in badge work by your child?	Pearson Correlation	.544
	Sig. (2-tailed)	<.001
	N	546
A4 how do you rate the level of creativity in your child?	Pearson Correlation	.475
	Sig. (2-tailed)	<.001
	N	546
A5 how do you rate the overall scouting performance of your child?	Pearson Correlation	.623
	Sig. (2-tailed)	<.001
	N	546
A7 how satisfied do you think your child is in Scouting?	Pearson Correlation	.627
	Sig. (2-tailed)	<.001
	N	546
B1 how do you rate the level of Scouting knowledge and skills in your child's leaders?	Pearson Correlation	.653
	Sig. (2-tailed)	<.001
	N	546
B2 how do you rate the level of commitment of your child's leaders?	Pearson Correlation	.673
	Sig. (2-tailed)	<.001
	N	546
B3 how do you rate the level of creativity of your child's leaders?	Pearson Correlation	.717
	Sig. (2-tailed)	<.001
	N	546
B4 how do you rate the level of motivation of your child's leaders?	Pearson Correlation	.722
	Sig. (2-tailed)	<.001
	N	546
B5 how do you rate the overall performance of your child's leaders?	Pearson Correlation	.722
	Sig. (2-tailed)	<.001
	N	546

		Total
C1 how effective is the communication between parents and leaders within your child's Scout Group?	Pearson Correlation	.609
	Sig. (2-tailed)	<.001
	N	546
C3 how do you rate the way the Scouting programme is delivered?	Pearson Correlation	.776
	Sig. (2-tailed)	<.001
	N	546
C4 do you feel your child is during Scout meetings and activities?	Pearson Correlation	.578
	Sig. (2-tailed)	<.001
	N	546
C5 how do you rate the recruitment process of members of your Scout Group?	Pearson Correlation	.628
	Sig. (2-tailed)	<.001
	N	546
C6 how do you rate the overall performance of the internal processes within your child's Scout Group?	Pearson Correlation	.736
	Sig. (2-tailed)	<.001
	N	546
D1 how reasonable do you think the annual membership fee of your child's Scout Group is?	Pearson Correlation	.502
	Sig. (2-tailed)	<.001
	N	546
D3 how do you rate the frequency of fundraising activities organised by your child's Scout Group?	Pearson Correlation	.543
	Sig. (2-tailed)	<.001
	N	546
D6 how much do you think your child's Scout Group is investing in new equipment?	Pearson Correlation	.681
	Sig. (2-tailed)	<.001
	N	546
D7 how do you rate the transparency in financial statements (how much you know about the income and expenditure) of your child's Scout Group?	Pearson Correlation	.502
	Sig. (2-tailed)	<.001
	N	546
D8 how do you rate the financial performance of your child's Scout Group?	Pearson Correlation	.619
	Sig. (2-tailed)	<.001
	N	546

Table 1: Pearson Product Moment Correlation Test applied to all Likert Scale Questions

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.905	.921	21

Table 2: Cronbach's Alpha Test applied to all Likert Scale Questions

Findings for each dimension: Scout Members, Scouters, Internal Processes and Finance

Scout Member's parents were asked to rate from 1 to 9 (1 = lowest rating, 9 = highest rating) each of the 16 indicated KRAs, the overall performance of the four dimensions of the BSC and the overall Scout Member's satisfaction. From the gathered data, the mean ratings for each KRA, the overall performance of the four dimensions and the overall Scout Member's satisfaction were calculated. The overall Scout Member's satisfaction is found to have a mean rating of 8 out of 9 which is equivalent to 89%, whereas the mean ratings of the individual KRA and the overall performance of each dimension are presented in Table 3 and Table 4.

KRA	KPI
	Metric: Rating out of 9*
The Scout Members Dimension	
Development of skills	7.6
Interest in Scouting	7.9
Number of badges achieved	6.6
The level of creativity	7.5
The Scouters Dimension	
The level of Scouting knowledge & skills	8.3
The level of commitment	8.6
The level of creativity	8.2
The level of motivation	8.4
The Internal Processes Dimension	
Effectiveness of communication with parents	8.1
The way the programme is delivered	8.0
Adhering to the safe from harm policy	8.3
The recruitment process of new members	7.6
The Group's Finance Matters Dimension	
Membership fees	8.2
The number of fundraising activities	7.0
Investing in new equipment	7.4
Transparency in financial statements	7.0
** 1- lowest rating, 9 - highest rating*	

Table 3: The mean ratings of the individual KRAs

KRA	Metric	KPI
The Overall performance of Scout Members	rating from 1 - 9*	7.6
The Overall performance of Scouters	rating from 1 - 9*	8.4
The Overall performance of Internal Processes	rating from 1 - 9*	7.9
The Overall Group's Financial Performance	rating from 1 - 9*	7.2
** 1- lowest rating, 9 - highest rating*		

Table 4: The mean ratings of the overall performance

Moreover, in an open-ended question, Scout Member's parents were asked to give the reason/s why their child was enrolled in a Scout Group. Many reasons were common. Consequently, the four main reasons why children are enrolled in a Scout Group are: to learn new skills, for adventure, to make new friends and because they have family members who are already into Scouting.

In addition to the questions related to the four financial KRAs, three further questions related to finance matters were asked. 17.8% of the parents stated that their Scout Group's annual subscription is under 50eu while 75% stated that their annual fee is in the range of 50 to 100eu. In contrast, 6% pay between 101 and 125eu for their annual fee while a further 1.3% pay over 125eu. This shows that the majority of Scout Groups do not charge more than 75eu as their annual membership fee. The two other questions were related to fundraising. 67.8% of the parents think that more fundraising activities should be organised and should more fundraising activities be organised, only 2.6% are sure of not attending.

The Relationship between Variables

To measure the degree of correlation, Spearman Correlation tests were performed to determine whether the overall performance of Scout Members, Scouters, Internal Processes and the Group's Financial Matters correlate with Scout Member's satisfaction. The questionnaire results show that:

1. There is a moderate-to-strong relationship between the overall performance of the Scout Members and Scout Members' Satisfaction, having a correlation coefficient of 0.57 and an R-squared value of 0.362.

2. There is a moderate relationship between the overall performance of the Scouters and Scout Members' Satisfaction, having a correlation coefficient of 0.42 and an R-squared value of 0.190.

3. There is a moderate relationship between the overall performance of the internal processes and Scout Members' Satisfaction, having a correlation coefficient of 0.41 and an R-squared value of 0.145.

There is no association between the overall group's financial performance and Scout Members' Satisfaction due to a low correlation coefficient of 0.22 and an almost null R-squared value.

The optional feedback given by parents

At the end of the questionnaire, parents were asked whether they had any additional comments. 66 valuable comments were stated that can be grouped as follows:

1. Appreciation towards leaders
2. High parent's satisfaction
3. The need to raise financial awareness
4. Inefficiency of the Scout Shop
5. More attention to bullying
6. The need for Financial Aid

Discussion

The sample of parents which was 16% of the total population, was representative because the respondents were parents of both girls and boys from all the sections and districts. Furthermore, although not entirely proportional, the sample of parents is still relatively proportional to the number of members in each section (the Colony [1], the Pack[2] , the Troop[3] and the Unit[4]) and district (North, Central, South and Gozo).

The KRAs related to Scout Members

When analysing the rating of the development of skills in members, Unit members section was given the highest rating whereas Colony members had the least percentage of high rating. This proves the adherence to the motto of the sections (The Scout Association of Malta, 2014) where the Colony focuses on making friends rather than on Scouting skills, and the Unit focuses on looking wide which widens and develops Scouting knowledge and skills respectively. With regards to districts, the percentage of high ratings for the Central district is relatively low when compared to those of the other. One possible reason is that the Central district has the highest percentage of members in the Pack and Troop sections.

Concerning interest in Scouting, the sections which had the highest ratings are Colony and Unit sections. One reason why Beavers are slightly more interested in Scouting than Cubs is that as explained by Harackiewicz et al. (2016), the interest in Beavers is initially triggered by their family or close friends and by time, they either develop their interest or start showing dissociation. As a matter of fact, the outstanding high percentage of the Ventures' parents who gave a high rating, proves that the Ventures are part of the Unit because they want to and not because they are highly influenced by others. This once again proves the research by Harackiewicz et al. (2016). On the other hand, when relating interest in Scouting to districts, the Gozo district has the highest percentage of high ratings. One possible reason is that the highest percentage of respondents in the Gozo district was from the Unit.

The third performance measure was related to the progress in badge work by Scout Members. The mean rating for the number of badges achieved is worrying since it is the lowest rating of all dimensions. This issue is found across all sections and districts. Members are developing their skills, and they have an interest in Scouting. Therefore, the problem does not lie in the Scouting programme itself or is specific to one section or district. The optional feedback received from parents shows that children are demotivated to complete the requirements needed to be awarded a badge since badges are constantly out of stock.

Creativity blooms in young children, particularly in those who are between six and seven years old and starts to decline once children are eight years old (Anthony, 2021). This is also evident in the findings of this study. Members in the Colony and Pack sections are found to be creative whereas this study shows a drop in the level of creativity in the Troop section. Compared to the Troop section, the Unit section is relatively high. The reason being is the same as that for Scouting interest, that is, those who remain in Scouting are those who are interested, thus developing further their skills and creativity. Concerning districts, ratings are similar to that of sections.

Stating the fact that the overall Scout population by gender is not available, the analysis is limited to gender analysis of respondents' children. Consequently, when comparing the ratings of each KRA to the gender of the respondents' children, it can be concluded that gender does not affect the development of skills and interest in Scouting. In contrast, gender does affect the progress in badge work and creativity. As a matter of fact, female members tend to progress more in badge work and have a higher level of creativity than boys. The latter was also stated by Wong & Kemp (2018) who described boys as being more technical and girls as being more creative.

1 members are referred to as Beavers and are aged between 5 and 7
2 members are referred to as Cubs and are aged between 7 and 11
3 members are referred to as Scouts and are aged between 11 and 14/5
4 members are referred to as Ventures and are aged between 14/5 and 18

The KRAs related to Scouters from a parents' perspective

From the feedback and responses received, Scouters are performing well in all areas. When compared to other KRAs from other dimensions, Scouters have the highest mean rating (refer to Table 3). Nonetheless, a cross-tabulation exercise was performed to relate the performance of Scouters to sections and districts.

The cross-tabulation exercise showed that Scouters of all sections from all districts have the right knowledge and the right skills. However, Scouters from the Gozo district and the Colony section tend to excel the most. Furthermore, the mean rating of Scouters' commitment is the highest of all KRAs as seen in Table 3. The results further reveal that Scouters from the Central district and those of the Colony and Troop sections are slightly more committed.

When analysing the Scouters dimension, creativity has the lowest mean rating. The Gozo district has the highest ratings whereas the North has the lowest percentage for high ratings. This calls for further research: what is happening in the Gozo districts that is not occurring in the other districts? Considering sections, parents consider the Scouters of the Colonies to be the most creative, while those of the Units are considered to be the least creative. This is not a surprising outcome as the Colony's programme asks for creativity. Furthermore, as highlighted by Gomerčić (2019), the younger the children are, the more creative the educator should be, thus the reason why Scouters of the Colony tend to be the most creative Scouters.

Furthermore, the questionnaire's result confirms the high motivation in Scouters throughout all districts and sections. Scouters with the highest level of motivation are once again found to be in the Gozo district and the Colony section whereas those with the least motivation are from the South district and the Unit section. Nonetheless, motivation in Scouters has a mean rating of 8.4 as found in Table 3. Having a high level of motivation in Scouters is of utmost importance since nowadays, in Malta, it is difficult to find volunteers (Azzopardi et al., 2022) and thus, retaining Scouters within TSAM is essential.

The KRAs related to the Internal Processes from a parents' perspective

When eliciting the KRAs related to internal processes, the KRA's suggestions (communication, the way the sectional programme is delivered, adhering to the safe-from-harm policy and the recruitment of new members) are all related to those mentioned by Niven (2006), thus making these KRAs relevant to this study.

The cross-tabulation exercise performed shows communication effectiveness between Scouters and parents is highest in the South district and the Pack section and is lowest in the Gozo district and Unit section. Having the Unit section with the lowest percentage of the ratings is of no surprise as parents themselves stated that communication mostly happens between Ventures and their leaders, and thus parents are not always aware of what is happening. This also explains the reason for the percentage of the Gozo district, as the highest percentage of the respondents of the Gozo district have their child in the Unit section. Furthermore, when dealing with young children, regular communication with parents is essential for parents to be aware of what is happening and what meetings and activities are being planned (Major, 2023). Thus, this contributes to the higher rates of communication effectiveness in the Colony and Pack sections.

The way the sectional programmes are delivered has a mean rating of 8.0 as shown in Table 3. The Gozo district and the Colony section perform best in this area. In contrast, the North district and the Pack section have the lowest percentages for high ratings. One possible reason for the low rating is that the Pack's programme is the oldest compared with other section programmes which have all been revised in the last decade (The Scout Association of Malta, 2016; 2020a; 2020b). However, it was announced that a new Pack programme will be launched which will reflect the modern time (The Scout Association of Malta, 2024). In contrast, no reason could be deduced for the lower-than-average rate for the North district. Hence, this calls for further investigation.

The continuous emphasis on the application of the safe-from-harm policy by Scouters even on a worldwide level (World Organization of the Scout Movement, 2024), contributed to the positive rating in this area. As a matter of fact, this KRA has the highest mean rating within this dimension.

The high rating is evident within all districts and sections. This augurs well for Scout Groups as the encouraging ratings indicate that TSAM is taking one of the main processes – the regulatory and social process, mentioned by Niven (2006), seriously. Nonetheless, Scouters still need to spot any bullying and act accordingly. In fact, there were four comments from parents regarding bullying as their children did experience bullying within Scouting.

The recruitment process of new members has the lowest mean rating within the Internal Process dimension as shown in Table 3. This is evident throughout all districts and all sections. Scout Groups cannot accept everyone to join immediately. Scout Groups have to abide by the member-scouter ratio (The Scout Association of Malta, 2014). Thus, this results in long waiting lists which can make the recruitment process slow.

The KRAs related to the Group's Finance Matters from a parents' perspective

Although TSAM is a non-profit organisation, evaluating the finance matters is still important. Even though Scout Groups are not after profit, they still need the financial resources to be able to operate (2GC, 2008). For this study, the membership fee, fundraising, purchasing of new equipment, and financial transparency together with the overall financial performance, were analysed by performing a cross-tabulation.

The groups' membership fee has the highest mean rating within this dimension as shown in Table 3. The Gozo district has the highest ratings and the primary likely reason for this is that from the cross-tabulation exercise, the only two groups within this district, charge less than €50 and between €50 and €75 respectively. Furthermore, the difference in percentages within the sections is low as membership fees are standard and do not vary according to sections.

When further analysing the data, it can be concluded that most of the Scout Groups charge less than €100 and 81% who pay such fee are highly satisfied. Likewise, those who pay between €101 and €125 are highly satisfied. However, only 43% of those who pay over €125 are highly satisfied, indicating that the fee is not reasonable. Thus, it is evident that those groups who charge over €125 should reconsider the amount.

Together with transparency in financial statements, this KRA was rated the lowest within this dimension as shown in Table 3, having all districts, except that of Gozo, and sections having similar ratings. When asked whether there should be more fundraising activities, 70% of the respondents from the North, Central and South districts replied positively whereas only 36% of the respondents coming from the Gozo district agreed to have more fundraising activities. Furthermore, out of those who asked for more activities, 2.6% claimed that they would not be interested in attending. therefore, this shows the need for more fundraising activities especially for the North, Central and South districts.

As shown in Table 3, the mean rating for the investment in new equipment is 7.4. The Central district and the North district have the highest and lowest percentages for high ratings respectively. More investigation in this area is required to discover why the groups within the North district are not investing enough in equipment. When considering the sections, all sections have between 49% and 54% of the respondents who think that Scout Groups do invest in equipment, having the Unit section experiencing the lowest ratings. However, one possible reason can be that as highlighted by Williams et al. (2002), the parents of these members are not aware of what is being invested since the older the child is, the less the parents are involved and aware of certain issues.

With reference to financial transparency, excluding the Gozo district, respondents from all other districts and sections gave low ratings to this KRA. It appears that presenting the financial statements only during the Annual General Meeting (The Scout Association of Malta, 2014) is not sufficient. Distributing a hard or soft copy of the financial report after the Annual General Meeting is one suggestion. A further suggestion is holding a half-yearly financial meeting. As a matter of fact, there were 9 comments left by parents stating they were not aware of the group's financial situation.

Scout Members' Satisfaction

"Customer satisfaction is the measurement of how content customers are with the overall customer experience. This includes not only how happy a customer is with a purchase or service, but also how satisfied they are throughout the customer journey" (Customer Alliance, 2021, p. 3). This applies to TSAM. The experience and satisfaction of members increase members' loyalty towards Scouting, thus contributing to the acquisition and retention of members (Manyanga et al., 2022).

Therefore, measuring Scout Members' satisfaction is important.

From a parents' perspective, the Scout Members' satisfaction is rated as 89%. Those who are the most satisfied are those from the Gozo district and the Unit section. Once more confirms the research by Harackiewicz et al. (2016): the Ventures remain part of the Scout Group of their own will, otherwise if, dissatisfied they quit (the highest percentage of respondents from the Gozo district is from the Unit section).

When analysing the correlation between the Scout Members' satisfaction and the independent variables, the Scout Members' performance affects 36% (R2=0.36) of Scout Members' satisfaction while the way Scouters perform affects 19% (R2=0.19) of members' satisfaction. In addition, the way Scouting is operated affects a further 15% (R2=0.15) of members' satisfaction. Therefore, in summary, according to this study, the Scout Members' performance, the Scouters' performance and the internal processes result in 70% of Scout Members' satisfaction which is quite high. However, this calls for further research to investigate the other 30%.

Furthermore, the correlation analysis shows that the group's performance in finance matters does not affect Scout Members' satisfaction. Research shows that the five main factors which make children happy at school are: "enjoying being with other people, having self-confidence, wanting to go to school, having training, feeling school is a safe place" (Mertoğlu, 2020, p. 12). All these factors apply to Scout Members. No reference to money is made. Fun and friends, mentioned by parents, by Bartolo (2017) and by The Scout Association of Malta (2023a), are two of the main reasons why children join Scouting irrelevant how much the fee is! Therefore, this proves that the performance in the group's finance matters has minimal or no effect on Scout Members' satisfaction.

Conclusion

The aim of the study can be restated as being to evaluate the performance of Scout Groups within TSAM, and to determine whether Scout member's satisfaction is affected by financial and non-financial dimensions. The operational effectiveness of Scout Groups has been determined by analysing several KRAs related to the Scout Members, the Scouters, the internal processes and the group's finance issues.

From the primary research conducted it shows that, from a parents' perspective, Scout Groups are performing well. The study concludes that from a parents' perspective:

- The overall performance of the Customer (Scout Members) dimension is 84%.
- The overall performance of the Learning and Growth (Scouters) dimension is 93%.
- The overall performance of the Internal Processes dimension is 88%.
- The overall performance of the Finance dimension is 80%.

This resulted in an overall performance of 86%. In addition, when looking at the KRAs within each dimension, the KRA which has the highest rating is the commitment of Scouters, while the lowest rating is related to the badges achieved by the Scout Members.

Moreover, it is concluded that the aim of this study has been attained and the findings from a parents' perspective related to the Scout Members, the Scouters and the internal processes were found to be statistically correlated with the Scout Members' satisfaction. In contrast, it has been concluded that the Scout Members' satisfaction is not affected by the group's finance matters.

To improve Scout Groups' performance, targets and initiatives for every BSC dimension should be set. It is being proposed that the performance of all KRAs is to be evaluated annually to know which areas to focus on. Once the target is achieved, the respective KRA is replaced with another KRA suggested by the GSLs.

We are living in an era where the world is rapidly and constantly changing – technology is changing, the social norms are changing, the global economy is changing and politics are changing (Kumar, 2023). Consequently, it is impossible to have a 100% rating for performance. Since, as highlighted by Strickland (2003) targets set should be achievable, the proposed target for each KRA is 95% or a rating of 8.5 out of 9. This target is achievable since the target has already been achieved in one KRA, namely, the level of commitment.

Limitations and Further Research

It "is critically important" to reflect on the limitations encountered during the study by considering "the nature of the uncertainty" (Lingard, 2015, p. 136). In other words, limitations should be acknowledged, and one should reflect on the uncertainties resulting from the limitations.

The first limitation was time. This study was solely from a parents' perspective. Given more time, this study would have been carried out also from a Scout Members' perspective and even from a Supply-side perspective (that is, the Scouters' perspective) to make a thorough comparison between the demand- (the Scout Members' or parents' perspective) and supply- side. A further recommendation for related research is the application of the BSC to TSAM having Scout Groups as customers and the members within three organs of TSAM as the employees. Evaluating the performance of TSAM is important as it directly affects Scout Groups.

Another limitation is that no records related to members' gender percentages were found. Thus, no cross-tabulation exercise related to gender was performed as there was no certainty that the sample was a true representation of both genders. Collecting and interpreting data related to gender could be another suggestion for further research.

Acknowledgement

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Conflict of Interest

Elaine Zarb Giorgio is a section (Troop) leader within the Central District. Care was taken to avoid any research bias. Consequently, the members' parents within the author's section participated solely in the pilot study conducted a priori the distribution of the questionnaire to provide critical feedback to further help the researcher in presenting a clear and simple questionnaire.

Furthermore, random sampling was used to further minimise the "impacts on the validity and reliability of study findings" (Smith & Noble, 2014, p. 100). Moreover, having the respondents self-administer the online questionnaire and avoiding leading questions further minimised the influence on respondents.

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04 The inclusion of childcare facilities into existing aging facilities seen by the management and the parents of children who attend the childcare centres as a component of quality of life and a sustainable strategy for success.

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Abstract

Objectives:
The integration of childcare facilities within existing aging institutions is a specialised initiative designed to foster regular interactions between young children and elderly residents. This approach highlights the importance of intergenerational practices, which include socialisation, meaningful engagements, and the cultivation of bonds between these distinct demographic groups. This study aims to evaluate the feasibility, vision, and commitment of management in incorporating childcare centres within elderly institutions. Evidence suggests that such initiatives offer multifaceted benefits for both demographics, promoting valuable partnerships while maintaining high standards of care and service for both young children and the elderly. These programs help mitigate feelings of isolation and loneliness, provide opportunities for learning and socializing, and foster a deeper understanding of social-emotional development. They also contribute to sustainability, inclusivity efforts, and the overall quality of life in intergenerational relationships.

Methods:
The research examines the perspectives of management in including childcare facilities in aging institutions and seeks insights from parents or guardians whose children attend these centres. It aims to understand their viewpoints and preferences to formulate recommendations that promote diversity and inclusivity. The study employs qualitative research methods, including questionnaires and interviews. Participants included parents of children enrolled in childcare centres across Malta and Gozo. Additionally, one-on-one interviews were conducted with fourteen individuals, including experienced childcare managers, centre coordinators, and directors of elderly homes. Key findings revealed gaps in knowledge and awareness, identified numerous advantages and common needs, and emphasised the role of grandparents in societal shifts. The study also highlighted weaknesses and potential threats associated with this initiative.

Results:
The study suggests that future research should directly capture the perspectives of both children and the elderly. Addressing cultural exchange, reducing ageism, dispelling stereotypes, and fostering mutual understanding are central considerations. Economic implications and regulatory frameworks also pose limitations. Overall, the insights from this study highlight a shift from passive engagement to active performance, moving beyond program-oriented methodologies to cultivate authentic closeness. The central objective is to ensure enduring, sustained success in enhancing the overall quality of life for all stakeholders involved.

Keywords: "Intergenerational practices"; "inclusion efforts"; "childcare / elderly facilities"; "quality of life"; "socialization.".

Highlights:
• This study investigates the integration of childcare facilities within elderly institutions to promote intergenerational interactions. It assesses the feasibility and benefits for both demographics while incorporating parents' perspectives. The research highlights significant social, emotional, and educational advantages, aiming to mitigate isolation and ageism and promote inclusivity and sustainability. Ultimately, the study advocates for active, meaningful engagements to improve the quality of life across generations.

• The main results of the study underscore the multifaceted benefits and challenges of integrating childcare facilities within elderly institutions. Parents and managers acknowledged the potential for these programs to combat loneliness and enhance mental well-being for both demographics through meaningful interactions. Additionally, the study identified practical benefits, such as cost savings and streamlined operations, and emphasized the need for increased public education and curriculum integration. Overall, it highlights the importance of intergenerational programs in fostering emotional connections, cultural exchange, and community cohesion.

• The study supports decision-making by highlighting the benefits and challenges of integrating childcare facilities within elderly institutions. It informs policies to promote intergenerational interactions, emphasizing the need for increased awareness, education, and regulatory support. The findings advocate for policy changes, public education, and curriculum integration to foster inclusivity and sustainability. Additionally, it provides evidence of positive impacts on emotional well-being, cognitive function, and social cohesion, encouraging investment in these initiatives for long-term societal benefits.

Abbreviations:
GDPR: General Data Protection Regulation
FES: Foundation for Educational Studies
.

Introduction

Historically, public health and community well-being were often overshadowed by the pursuit of wealth and power. However, diverse cultural influences have significantly shifted this perspective. Today, there is a growing recognition of the importance of improving individual welfare, as highlighted by the World Health Organization in 2013, (World Health Organization, 2013). While traditional beliefs may be evolving, new values and behaviours continue to emerge.

The study examines the benefits of intergenerational activities for young children and elderly individuals, focusing on the feasibility of integrating childcare centres within senior institutions. This innovative approach aims to provide mutual benefits, such as reducing isolation and fostering socialisation, and is gaining international recognition (Peters et al, 2021). The research seeks to establish partnerships while maintaining high standards of care, promoting empathy, and supporting social-emotional development. The strategic plan aims to enhance the quality of life for both age groups, aligning with the organization's mission and principles.

Intergenerational programs hold great promise but face challenges such as financial concerns and attracting participants. Effective planning and stakeholder collaboration are essential to cater to both elderly adults and children, overcoming issues like ageism and stereotypes (APA, 2014). Evaluating their impact is complex due to the nuanced nature of changes in intergenerational relationships (WHO, 2015). These programs include mentoring, volunteer work, and educational initiatives that promote meaningful interactions across generations. Ensuring long-term sustainability requires a focus on profitability, environmental considerations, and strong stakeholder relationships to enhance the quality of life for all involved (Mella & Gazzola, 2015; Misra, 2019). Consequently, a review of the research problem suggests the following research objectives:

- To identify perspectives of how is the inclusion of childcare facilities into existing aging facilities are seen by management and the parents of children who attend the childcare centres as a component of quality of life and a sustainable strategy for success
- To determine strategic management methods, viewpoints and features of implementing intergenerational practice along with the parents of children who attend childcare centres

This research endeavours to concentrate on the managerial viewpoint within childcare facilities servicing both in Malta and Gozo, alongside elderly care facilities dispersed across the islands. Furthermore, it undertakes to solicit input from parents (Sollars, 2020) whose children are enrolled in childcare centres, particularly targeting the demographic age between 0 to 3 years. The investigation of these viewpoints seeks to offer a fresh and insightful perspective for future deliberations. The research is positioned to conduct an in-depth exploration of these perspectives, seeking to comprehend their opinions and inclinations, with the intent of formulating potential recommendations.

Methodology

The methodology chapter shall explain the rationale behind research framework adopted. The constraints encountered during the study are also briefed and discussed.

Research approach

The study employs an inductive reasoning approach within a qualitative design, using a phenomenological methodology to understand how individuals interpret and experience emotions (Tomasezwski et al., 2020). This approach aims to uncover the daily influences on management practices in childcare centres from the perspectives of parents and to explore the benefits of integrating senior residents with young children (Aspers & Corte, 2019; Shaheen, Pradhan & Ranajee, 2021). The research highlights the potential of intergenerational programs to enhance life satisfaction and social-emotional development (Aymerich et al., 2021; Mineo, 2017), and emphasizes the importance of management support and collaboration (Martin et al., 2010).

Research Design

The investigation anticipates uncovering both positive synergies and challenges related to social inclusion practices, offering insights aligned with national policies on active aging (Perez-Encinas et al., 2021; Muskat & Reitsamer, 2019). Through a triangulation approach to data collection, including face-to-face interviews and purposive sampling of experienced childcare and elderly care managers, the research aims to provide a comprehensive view of intergenerational understanding and its impact (Bans, Akutry & Tiimub, 2021; Qutoshi, 2018; Neubauer, Witkop & Varpio, 2019). Participants were briefed on the research's objectives and procedures, ensuring informed consent and ethical approval for accurate data capture and analysis.

Research Validity

The study upholds reliability and validity through reflexivity, meticulous data collection, and transparent documentation, drawn from three sample groups: facility managers from elderly homes, managers or coordinators from childcare facilities, and parents of children aged between 0 and3 years attending childcare centres, (Asiamah et al., 2017; Campbell et al., 2020). Purposive sampling techniques ensure representation from the 29 elderly care facilities and 108 registered childcare facilities in Malta and Gozo, facilitating a comprehensive understanding of the phenomenon (Campbell et al., 2020). However, GDPR prevented the distribution of online questionnaires to parents of children in FES Childcare centres, excluding 415 children from 12 centres from participation.

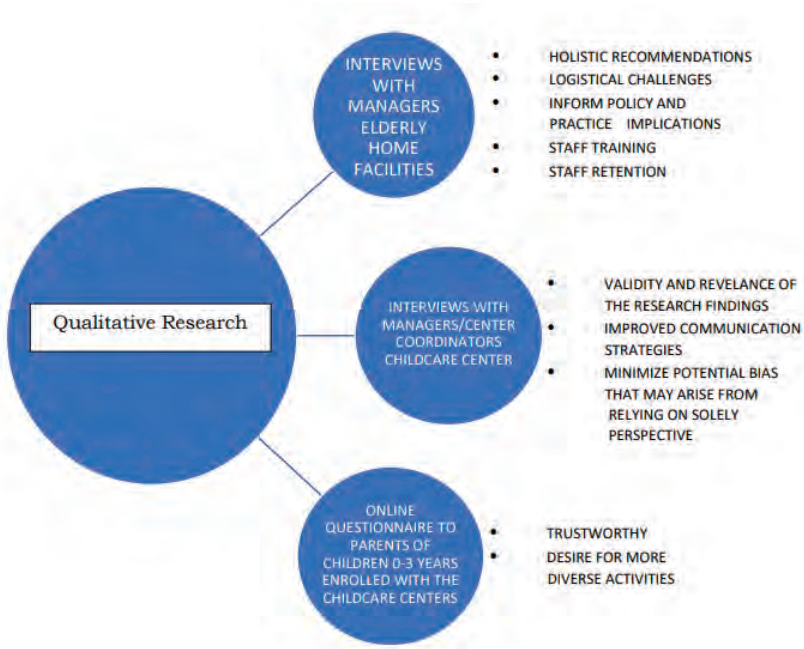

Figure 1 Research Insights

The Sample and Data Analysis

The survey conducted was based on a population framework, determining a sample size of 372 surveys to achieve a 95% confidence level with a 5% margin of error, despite the exclusion of FES centre participants (Asad, 2021). Initial sampling involved inviting managers of private elderly homes and childcare centres for interviews and distributing online surveys to parents, with participants providing informed consent. Low response rates prompted in-depth interviews, and follow-ups were conducted due to limited questionnaire responses. Despite challenges, the study aims to gather insights from fourteen participants using semi-structured face-to-face interviews, ensuring transparency and ethical standards (Rutakumwa et al., 2019; Maschiach, 2016). The qualitative data collected contribute to identify sustainable development and inter-generational equity initiatives (MIPAA/RIS, 2021), aligning with established research practices (Popping, 2015; Memon et al., 2020).

This qualitative research incorporates an online survey to gather opinions on intergenerational activities, aligning with recommendations from Sharma (2022), and involves parents from diverse backgrounds, ages, and perspectives, as advised by Taherdoost (2016). The survey, developed with a combination of open and closed-ended questions, was distributed through childcare facilities, ensuring broad coverage, and data analysis involved thematic analysis supported by verbatim notes (Kiger & Valpio, 2020). The findings highlight the importance of financial investment in parent education programs to foster intergenerational engagement, aligning theoretical insights with practical applications (Elza Venter, 2017). Integrating childcare centres and elderly homes within the business sector offers promising avenues for sustainable innovation and enhanced brand prominence (Dwivedi et al., 2019).

Ethical consideration

This study ensured to secure ethical approval, as emphasized by Fleming & Zegwaard (2018), and rigorously followed ethical principles, ensuring informed consent, voluntary participation, anonymity, confidentiality, GDPR compliance (Information and Data Protection Commissioner, 2018), and respect for diverse beliefs. This commitment to ethical conduct ensures that the research report respects the perspectives and opinions of readers (Fleming & Zegwaard, 2018). Additionally, the research employed a bottom-up methodology to explore intergenerational practices among administrators, focusing on pairing children aged zero to three with elders (Tie et al., 2019), offering valuable insights for policymakers and innovators in enhancing quality of life through intergenerational initiatives.

Results

The Research Aims

This research examined management practices, perspectives, and parental attributes related to intergenerational practices, aiming to reflect the broader population through its samples. Thematic analysis of qualitative findings revealed themes organised into sub-categories to discern significant patterns (Nowell, 2017). The analysis focused on pertinent information while safeguarding participant identities, with extra supporting conclusions. The study aimed to explore the logical interconnected nature of these themes, elaborating further, and addressing potential bias by actively seeking contradictory evidence (Lingard, 2019).

Each participant's profile, concealed with pseudonyms, was methodically organised, allowing readers to relate conclusions drawn from their insights. Notably, female participants excelled in the childcare centre interviews, with all fourteen participants meeting the criteria of over two years of managerial or centre coordinator experience, including three men and eleven women. The questionnaire was available only in English to accommodate potential diversity.

Part	Elderly / childcare facilities	Years in management occupation	District	Government/ Private/Private with PPP/ Church/FES	code/ pseudonym
1	Elderly Home	26 years	Gozo District	Church	MS E 01(interview performed in Maltese)
2	Elderly Home	10 years	Northern Harbor District	Private/PPP	MS E 02
3	Elderly Home	10 years	Western District	Private/PPP	MS E 03
4	Elderly Home	13 years	Northern District	Government	MR E 04(Interview performed in Maltese)
5	Elderly Home	6 years	Southern Harbor District	Private/PPP	MR E 05
6	Elderly Home	5 years	Northern harbor District	Private/PPP	MR E 06
7	Childcare	10 years	Western District	Private	MS C 07
8	Childcare	3 years	Western District	Private	MS C 08
9	Childcare	5 years	Northern Harbor District	Private	MS C 09
10	Childcare	12 years	Gozo District	Private	MS C 10 (interview performed in Maltese)
11	Childcare	2 and a half years	Northern Harbor District	Private	MS C 11
12	Childcare	2 years	Northern District	Private	MS C 12
13	Childcare	5 years	Northern Harbor District	FES	MS C 13
14	Childcare	3 years	Northern Harbor District	FES	MS C 14

Figure 2 Characteristics of participants

A convenience sample of parents with children aged between 0 and 3 years from 33 childcare centres in Malta and Gozo yielded 237 responses. Among these 215 females and 22 males, 48 are of non-Maltese heritage. Most parents reported having one enrolled child, and children were primarily aged between 25 and 36 months, attending five days a week. In terms of elderly facility visits, 40 parents confirmed relatives there, with varying visit frequencies, while concerns included childcare, safety, and specific conditions.

The interview aimed to assess familiarity with intergenerational interactions among 14 participants. Of these, four were unfamiliar with the concept, three demonstrated a good understanding, and one lacked clarity. One participant expressed interest in integrating childcare into elderly facilities, inspired by Scandinavian models, while another introduced a novel initiative. A different participant shared experiences from the United Kingdom, where nurseries are combined with elderly care. An interviewee also observed similar programs abroad, contrasting these with local initiatives. Notably, deficits in awareness were identified, leading one participant to recommend public education campaigns, and another emphasizing the importance of curriculum integration. Among surveyed parents, 161 lacked knowledge about intergenerational interactions, 67 were aware, and nine were uncertain. Overall, parents exhibited varying levels of awareness regarding these programs.

The intersection of young and elderly populations presents a valuable opportunity to combat loneliness through meaningful interactions, fostering profound connections and mentorship roles (Theng, n,d). Results indicated that elderly individuals acknowledge similarities with infants in their daily needs, underscoring the mutual benefits of intergenerational engagement.

Both groups often experience loneliness, suggesting that these relationships can alleviate isolation. Concerns about elderly sadness highlight the need for proactive management, as psychological challenges for both cohorts, such as medication reliance and family distance, require attention. These intergenerational programs offer potential solutions by bridging generational gaps. The parental responses overwhelmingly affirm the positive nature of relationships with grandparents, despite challenges in visit frequency. Besides, grandparent-grandchild interactions provide joy and continuity to seniors' lives, while events facilitating such engagements yield significant happiness and bridge age gaps. Furthermore, demanding work schedules often result in children spending substantial time with grandparents, positively influencing their behaviours. These findings illustrate the enduring bonds and extensive benefits of intergenerational connections.

Moreover, the results underscored the pivotal role of human elements in addressing the unique needs of the elderly, enhancing their care and well-being through meaningful interactions. Integrating children with the elderly fosters unity, uplifts spirits, and creates cherished memories (Martin et al, 2010). The presence of children offers emotional support and a sense of belonging for the elderly, similar to the positive effects of pets, while evoking a youthful spirit. These interactions enhance the mental well-being of the elderly and stimulate reminiscence. Both parents and interviewees advocate for intergenerational programs to bridge cultural gaps and preserve traditions. Such interactions provide valuable learning experiences for children and strengthen community bonds. In addition, parents acknowledge the importance of early childhood interactions with the elderly for future learning and emotional development. It was noted that, the significance of language acquisition during the critical period underscores the importance of early exposure to diverse environments (Al-Harbi, 2020). The consensus among interviewees and parents highlights the reciprocal benefits of intergenerational interactions for all involved, emphasizing the multifaceted advantages of these connections.

Two of the interviewees emphasised the importance of increasing visits from school children to elderly facilities, advocating for comprehensive approaches to enhance these interactions. Intergenerational events have been shown to foster positive outcomes for both generations. Another, two aspirants highlighted the mutual learning and friendship-building potential between generations, emphasizing benefits for language development and mental health. Combining elderly and childcare facilities offers sustainability advantages, such as streamlined recruitment and cost savings. While parents exhibit varying attitudes towards intergenerational programs, there is a general willingness to explore their benefits. Despite challenges, stakeholders advocate for firsthand experiences to understand these initiatives' full potential. Besides, two different interviewees expressed eagerness to explore further opportunities for intergenerational interactions. For successful initiatives, it requires active stakeholder and positive involvement, staff training, and compliance with regulations. Sustainability involves simplifying logistics and fostering unity between generations. This includes careful planning and evaluation, which are essential for the success of these initiatives, thus ensuring they meet the needs of all participants and maximize their benefits.

Discussions

The core of understanding

The research identifies a significant knowledge gap among the indigenous population regarding intergenerational collaborations in elderly and childcare management. It highlights the similar needs of the elderly and young children, particularly in combating loneliness, and the multiple benefits of such initiatives for individuals and the broader community (Al-Harbi, 2020). Despite these benefits, the study also uncovers challenges and potential threats (Swift et al., 2017). Parents and interviewees emphasize the importance of diversity, inclusivity, and sustainability in these programs to enhance quality of life (Datta et al., 2016; Atkinson, 2019).

Fundamental insights explored

Various policies advocate for intergenerational collaborations, yet awareness and implementation remain low, with only 28.6% of interviewees and 68% of parents aware of such programs (MIPAA/RIS, 2021). Challenges were noticed, these include bureaucratic hurdles and health concerns, such as increased risk of infections (Korsten et al., 2022). The Covid-19 pandemic has exacerbated isolation, underscoring the need for these programs to foster social cohesion and improve health outcomes (Hosie, 2023). However, intergenerational interactions can mitigate loneliness and improve emotional well-being (Venter, 2017).

Combining young children and older adults enhances cognitive function, empathy, and overall quality of life, fulfilling essential needs from physiological to self-actualization (Trivedi & Mehta, 2019). Despite some parental concerns, these programs foster language development and positive behaviours in children (Thomson, 2017). The study advocates for intergenerational initiatives to strengthen community bonds and enhance quality of life across generations. It has been pointed out that elderly individuals value interactions with children, which improve emotional well-being and reduce risks of Alzheimer's, heart disease, and depression (Hsiao, Chang, Gean, 2018).

Enhancing community resources to improve the well-being of both young and elderly people is challenging but invaluable. The integration of childcare centres with elderly care facilities faces regulatory obstacles, limiting continuous interaction and creating a cohesive intergenerational environment. The study revealed that, 68.4% of parents support these programs, despite concerns about planning, financial implications, and safety (Leikvoll, 2022). Shared spaces like parks and community centres can facilitate these interactions, although logistical and emotional concerns remain (Dreisoerner et al., 2021).

The 2027 vision in the Social Agenda for Europe promotes social cohesiveness and inclusivity, aligning with literature, emphasizing well-being and quality of life (European Commission, 2018; Delhey). Fostering these meaningful connections can be achieved by integrating elderly and young children, thus achieving work-life balance, sustainability, and labour productivity. Moreover, studies show that intergenerational integration supports diversity, promotes sustainability, and invests in health (Giraudeau & Bailly, 2019). Successful programs can attract partners and stakeholders, enhancing living conditions and creating jobs (The European Commission, 2021). This effect may evoke the leveraging in the economy, cultural, and social factors thus can meet community needs and distinguish organizations competitively.

Conclusions

Emerging Horizons for further investigation

The study highlights a significant generation gap between young children and the elderly, emphasizing the importance of education, work environment, motivation, and social inclusion in providing comprehensive care. Parental acceptance of intergenerational programs is mixed, but many participants express enthusiasm for further exploration and implementation. Furthermore, it transpires that two of the interviewees plan additional research, and another one has seen positive results from a nearby childcare centre.

Further future research should focus on integrating early childhood settings into elderly facilities, emphasizing governmental responsibility in funding these initiatives. In addition, longitudinal studies could provide valuable insights into the sustained benefits of intergenerational programs, improving cognitive, emotional, and social development for both age groups (TILDA, 2022). Multi-modal methodologies that capture the voices of children and older adults are crucial, as their perspectives can inform program design and highlight benefits like improved communication, empathy, and understanding of diversity (National Children's Bureau, 2021).

Implementing these programs requires regulatory changes to sustain intergenerational engagement, with increased interaction frequency and diversified activities. Integrating childcare centres within workplaces can promote work-life balance and enhance employee well-being and productivity (Borg, 2015). Further studies should explore the cultural and economic benefits of these programs, including cost savings and policy implications, and examine if they reduce ageism, stereotypes, and promote mutual understanding (Perez-Encinas et al., 2021).

Interviews with entrepreneurs developing new elderly facilities in Malta and Gozo would validate these findings comprehensively. Such insights could address the feasibility of integrating childcare centres within these facilities, despite regulatory challenges, and support sustainability practices for a competitive advantage.

The study has strengths, including a substantial sample of parents and insights from various managers, but also faces limitations. GDPR regulations restricted some parental participation, potentially impacting data quality. Additionally, undisclosed policies and disinterest from some parents may have influenced information on intergenerational programs. The sample showed a gender bias, with all childcare coordinators being female, limiting diversity.

The regulatory framework allows childcare centres within elderly facilities but does not adequately address the generation gap or fully integrate the elderly and young children as seen in international programs. This suggests a need for more comprehensive intergenerational initiatives in Malta. The study's approach of interpreting non-verbal cues and narratives was valuable but highlighted the importance of local context due to limited data and literature.

The researcher expresses gratitude towards interviewees, recognizing their managerial skills, intelligence, and workplace experiences that provided invaluable insights. This experience inspired empathy and a desire to bridge generational gaps.

Nurturing Growth through study

The study recommends more research, policy enforcement, and practice to address the generation gap within the community, requiring organised efforts from national and local governments as well as the community. Enhancing the well-being of residents in long-term care facilities demands substantial dedication (Formosa, 2019). The older generation's experience and cultural heritage are crucial in reshaping societal values and debunking stereotypes (Institute of Research on Adult Education and Knowledge Management, 2023). Implementing policies effectively requires a proactive approach, as emphasized by Hadley (2019).

The initiative aims to leverage community values and culture to foster cross-generational support, transitioning from engagement to performance and from conceptualization to practical realization. The goal is to ensure sustained, long-term success in improving the quality of life for all involved parties.

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05 Consumer Dispute Resolution: Exploring Ways For Improvement

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Abstract

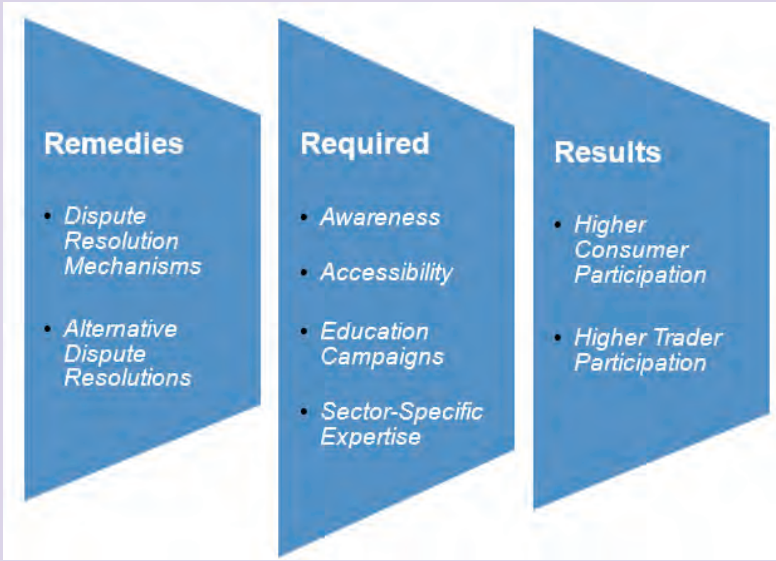
Objectives: This research aimed to address gaps within the Maltese Consumer Dispute Resolution (CDR) setup, by assessing the robustness and fragilities of existing procedures, whilst also seeking to determine the awareness levels amongst consumers and traders alike. It also investigated opportunities to improve current practices and eradicate difficulties that hinder participation by all parties.

Methods: An exploratory qualitative study was preferred, proposing an inductive stance. Interviewees were chosen by purposive sampling, with thematic analyses applied for data analysis. Semi-structured interviews were held with 11 key stakeholders in the field encompassing consumer experts, arbiters, ADR body specialists, and a representative from the business community. These participants represented 61% of all prospective institutions approached.

Results: The analysis revealed the need for enhanced consumer awareness and accessibility to dispute resolution mechanisms in Malta. The research suggests education campaigns and streamlined access procedures to improve consumer utilisation of available resources. Furthermore, the study highlights the importance of sector-specific expertise within ADR bodies and the potential benefits of mandatory trader participation in dispute resolution processes.

Conclusion: The research emphasised the need for comprehensive approaches to optimise CDR in Malta and beyond, through enhanced digital solutions, whilst also addressing digital literacy gaps and maintaining traditional dispute resolution methods for non-digital consumers.

Keywords:
"Dispute Resolution Mechanisms"; "Consumers"; "Alternative Dispute Resolution"; "Trader Participation"; "Awareness.".



GRAPHICAL ABSTRACT

Highlights:
1. Lack of awareness of the various possible resolution remedies and their accessibility, by both consumers and traders, is prevalent.
2. Barriers preventing consumers from availing themselves of the various resolution mechanisms include aversion, perceived complexity, lack of trust in authorities, lengthy procedures, and the amounts involved.
3. Factors hindering trader participation include time/cost concerns, a preference towards litigation measures, and a fear of repercussions.
4. Efforts to improve public education and streamline access to dispute resolution services could significantly enhance consumer outcomes.
5. Indicated system improvements include sector-specific expertise, mandatory trader participation, and integration of digital solutions.

Abbreviations:
ADR: Alternative Dispute Resolution
CDR: Consumer Dispute Resolution

Introduction

Background

The European Union (EU) prioritises consumer protection through a comprehensive framework of Directives and Regulations such as the Sale of Goods Directive (EU) 2019/771 and the Digital Content Directive (EU) 2019/770 that ensure consumers have clear rights before, during, and after purchasing products or services (Carvalho, 2019). However, despite these protections, some consumers remain hesitant to voice concerns when encountering issues. Factors like perceived time constraints, low monetary value of dispute, and fear of confrontation with traders can deter consumers from pursuing complaints (European Commission, 2023a).

Consumer dispute resolution (CDR) can follow two main routes: litigation through formal legal proceedings in court and non-litigation mechanisms, which involve extrajudicial methods. Consumers can choose between these options voluntarily to address any harm caused by business entities (Satory et al., 2022). Litigation may not always be the most cost-effective method due to potential lengthiness and complexity, especially for small claims. ADR offers a more expedient, cost-effective, and efficient approach, and involves neutral, third parties such as mediators, arbitrators, conciliators or similar professionals to facilitate mutually agreeable resolutions between consumers and businesses (Jeretina, 2016).

Recognizing the importance of addressing consumer grievances in a better and more effective manner, the EU promotes accessible Dispute Resolution Mechanisms (DRMs) (Gill et al., 2016). Effective DRMs are characterized by simplicity, empathy, respect, and professionalism (Lens, 2007; Brennan et al., 2017; Gilad, 2008; Sourdin, 2016). These mechanisms play a crucial role in levelling the playing field for consumers, who are often viewed as the weaker party in transactions due to their potentially lower knowledge of products and contractual matters, in comparison to businesses (Hadfield et al., 1998; Ruhl, 2011). By providing accessible avenues for redress, DRMs can contribute to increased consumer confidence, encourage good business practices, and ultimately foster market stability and growth (OECD, 2007).

Despite the potential advantages, data indicates that both consumer and trader participation in dispute resolution mechanisms (DRMs), particularly ADR, remains lower than anticipated (European Commission, 2019; BEUC, 2022; European Commission, 2023c). Challenges in addressing low-value disputes continue to be a concern (Situmorang, 2022).

This research aimed to enhance consumer dispute resolution mechanisms (DRMs) in Malta and the EU by examining both formal and informal approaches, including tribunals, conciliation, mediation, and arbitration. The study evaluated these mechanisms based on accessibility, cost, speed, and fairness to identify areas for improvement and propose solutions beneficial to both consumers and traders. By pinpointing deficiencies within the current system and recommending strategies to overcome barriers hindering consumer and trader participation, the research sought to develop practical solutions for improving DRMs and fostering a more equitable dispute resolution landscape.

Overview of Formal and Informal Consumer Dispute Resolution Mechanisms in Malta and the EU

Maltese Scenario

In Malta, formal mechanisms include Superior Courts (Constitutional Court, Court of Appeal, Court of Criminal Appeal, Criminal Court, and Civil Court) that are presided by judges due to their higher jurisdiction (Malta Law Courts, 2023); Inferior Courts (Court of Magistrates in Malta and Gozo) which handle cases between €5,000 and €15,000; and the Court of Magistrates (Gozo), handling both superior and inferior jurisdiction (The Courts, 2023). However, high costs and lengthy procedures can discourage consumers with limited resources from pursuing legal action (Harley & Said, 2017).

For small claims, Malta has two tribunals: the Small Claims Tribunal (SCT) and the Consumer Claims Tribunal (CCT). These tribunals provide for simpler, informal procedures, allowing parties to present their cases effectively (Matnuh, 2021), with judgments subject to appeal and enforced as an executive title. The SCT handles claims up to €5,000 with a fixed fee of €40, while the CCT deals with claims up to €10,000 and requires initial referral by the Director General (Consumer Affairs) or a registered consumer association (Consumer Affairs Act, 1994). It offers remote hearings and can award moral damages, with fees ranging from €7 to €41 depending on the claim value. Between January 2020 and March 2024, the CCT delivered 510 judgments (MCCAA, 2021; 2022; 2023a; MCCAA, 2024).

Other resolution mechanisms include the Malta Mediation Centre (MMC) that is regulated by the Mediation Act, 2004. The MMC ensures confidentiality and enforceability of agreements, although the €120 fee may deter some consumers (Mediation Act (Tariff of Fees) Regulations, 2008). On the other hand, the Malta Arbitration Centre (MAC), provides arbitration services for certain disputes. Governed by the Arbitration Act, 1996, it allows parties to select arbitrators freely, with mandatory arbitration for specific disputes, including condominium, motor vehicle, and electricity and water services disputes (Scerri Diacono & Bartolo, 2013). Consumer disputes are exempt from mandatory arbitration for the latter services. Nevertheless, arbitration fees can still be high for consumers (Gross, 2020).

Informal mechanisms available in Malta include the Office for Consumer Affairs (OCA) within the Malta Competition and Consumer Affairs Authority (MCCAA). The OCA safeguards consumers' interests and enhances their welfare through three Directorates including the Complaints and Conciliation Directorate which has two primary procedures, namely the conciliation procedure and the residual ADR procedure. It primarily resolves consumer disputes by proposing solutions or facilitating amicable resolutions, acting independently from the parties involved (MCCAA Act, 2011). Consumers typically seek conciliation first, and if unresolved, they can bring claims before the CCT.

Consumer associations in Malta play critical roles in resolving consumer disputes through amicable settlements, with unresolved cases potentially escalating to the CCT. Initially governed by Act XXIX of 1981, consumer protection laws were revised under the Consumer Affairs Act, 1994, which set the criteria for their recognition by the Consumer Affairs Council (CAC) (Micallef, 2009). Currently, the Association for Consumer Rights is the only officially registered association in Malta (Consumers' Association, 2024).

The European Consumer Centre (ECC) Malta assists consumers in resolving cross-border disputes within the EU. It provides guidance and facilitates solutions for complaints involving Maltese residents and EU traders, referring consumers to ADR bodies or the European Small Claims Procedure (ESCP) when necessary (ECC Malta, 2022).

In 2015 and 2016, the EU implemented the Alternative Dispute Resolution (ADR) Directive (Directive 2013/11/EU) and the Online Dispute Resolution (ODR) Regulation ((EU) No 524/2013), establishing a network of accredited ADR providers to address national and cross-border consumer disputes. Malta's implementation through the Consumer Alternative Dispute Resolution (ADR) (General) Regulations, 2015, mandated quality standards and outlined the ADR procedure. The CAC acts as the ADR regulatory authority, overseeing and monitoring ADR entities. In 2018, the Malta Gaming Authority issued Directive 5, mandating B2C gaming licensees to implement complaint procedures and refer disputes to ADR entities within the EU (Malta Gaming Authority, 2018).

Malta's ADR system includes eight accredited bodies:

1. ADR (Malta) Centre - handles consumer disputes involving goods and services with standard fees payable by consumers and shared hourly fees between the consumer and trader (Online Dispute Resolution, 2016).

2. Complaints and Conciliation Directorate, MCCAA - functions as the residual ADR body for disputes where no dedicated ADR entity is competent, offering free and voluntary participation (CADR, 2017).

3. EADR Ltd - specialising in leisure services disputes, particularly gambling and lotteries with no charges for consumers and annual fees for traders (EADR Ltd, 2023).

4. eCOGRA - focuses on online gambling disputes, providing free services for consumers and fixed monthly fees to license holders (eCOGRA, 2023).

5. MADRE - resolves disputes between consumers and online gambling operators with no charges on consumers and a fee agreement on operators (MADRE, 2019).

6. ThePOGG - addresses gambling disputes for EU consumers, offering free services for both consumers and traders, with revenue from affiliate marketing (ThePOGG, 2021).

7. Pardee Consulta - oversees disputes involving registered gambling sites, with consumer participation incurring no fees and traders shouldering associated expenses (Pardee Consulta, 2018).

8. Office of the Arbiter for Financial Services (OAFS) - resolves financial services complaints against any financial service providers licensed by the Malta Financial Services Authority. Opening a claim requires a refundable €25 fee, with unsuccessful mediations escalating to arbitration and appealable decisions (Bezzina et al., 2021).

EU Scenario

In many EU member states, similar to Malta, the judicial system comprises various types of courts, including ordinary courts that handle both civil and criminal disputes, specialized courts that focus on specific areas such as administrative matters, and constitutional courts that ensure laws comply with constitutional requirements. The latter typically play a limited role, acting as a last resort (European Justice Portal, 2021).

Most EU jurisdictions offer fast-tracking for small claims, featuring nominal fees and informal procedures, allowing self-representation and simplified rules (Harley and Said, 2017). Germany and Austria lack defined small claims tracks, but they have simplified procedures. Thresholds vary, with Germany's at €600 and the Netherlands at €25,000. Court fees also differ, with some countries using fixed fees and others a mix of fixed and percentage-based fees (Harley and Said, 2017).

Established by Regulation (EC) 861/2007, the ESCP offers an efficient formal mechanism for cross-border claims up to €5,000, excluding Denmark. Amended in 2017, it emphasizes electronic communication and reasonable court fees (Maffeo & Rolando, 2022). Despite its benefits, ESCP's usage is limited by lack of harmonization and awareness (Veersalu & Hoffmann, 2023).

Co-funded by EU member states and the European Commission, ECC-Net assists consumers with cross-border disputes via 29 offices across the EU, Norway, and Iceland. Their primary role is to attempt amicable resolutions directly with traders. If unsuccessful, they provide information on dispute resolution mechanisms, including ADR bodies and the ESCP. ECCs also serve as ODR advisors and collaborate with the Consumer Protection Cooperation network to address traders' violations. Table 1 illustrates the work carried out by ECC-Net with EU consumers during 2021 and 2022 highlighting the importance of this network and the tangible work that directly effects EU consumers.

ECC-Net	2021	2022
Consumer enquiries addressed	116,424	118,142
% of complaints resolved amicably	64%	60%
Amount recovered for EU consumers	€7,508,771	€9,904,715

Table 1: ECC-Net achievements. (Sources: ECC-Net Reports (ECC-Net, 2023a; ECC-Net, 2023b))

The ADR Directive and ODR Regulation introduced innovative CDR approaches in the EU. The ADR Directive promotes cost-effective out-of-court settlements, whilst the ODR Regulation established an online platform for consumer-to-business disputes (Caponi et al., 2015; Gill et al., 2016). Despite challenges and underutilization, the ADR Directive mandates quality standards for ADR entities and safeguards consumer rights (Cortés, 2016; European Commission, 2019, 2023b). The EU currently hosts 430 accredited ADR bodies, with ongoing legislative efforts to enhance effectiveness (European Commission, 2023b). Proposed amendments aim to strengthen the framework, exemplified by the Directive amending Directive 2013/11/EU (COM/2023/649), reflecting the EU's commitment to accessible and high-quality dispute resolution in retail sectors.

Methodology

Research Approach and Design

The study employed a qualitative, exploratory approach with an inductive stance, which, according to Saunders et al (2016), provides flexibility and can be adapted according to the data being gathered, be it through literature review, the interviews conducted, or other data-collection methods considered throughout the research. Semi-structured interviews were conducted with representatives from eleven prominent stakeholders within the CDR field, to acquire first-hand evaluations on the subject area. As corroborated by Azungah (2018), such method provides flexibility and enables interviewees to share their unique insights, without being constrained by predetermined concepts or researcher bias. This approach enabled participants to freely share their perspectives and experiences, leading to the identification of recurring themes, patterns, and relationships throughout the data collection and analysis process (Saunders et al, 2016).

Data collection was done primarily through semi-structured interviews, which focus on the richness and depth of data collected, rather than the number of participants (Tuckett, 2004). Since different methods and techniques were employed, all interviews were either recorded and transcribed, or written replies were provided, with the possibility for further updates, to ensure clarification and understanding. To guarantee a smooth interview experience and secure data storage, all necessary, virtual interview equipment, including external backups was prepared. This demonstrated respect for the participants' valuable time and effort invested in the study.

Sampling

Non-probability sampling provides a number of alternative sample selection techniques, most of which involve some form of subjectivity (Saunders et al, 2016). Within non-probability sampling techniques, purposive sampling was the preferred choice for this study since the selected stakeholders are dependent on the research question. This strategically chosen method offered flexibility and depth in exploring the subject matter. Figure 1 gives a brief overview of the main issues discussed during the interviews. The dispute resolution landscape encompasses various stakeholders, including experts within the consumer protection regulatory sphere, consumer representatives, arbiters and mediators, ADR body specialists, and representatives from the business community. A rigorous selection process was applied to ensure the inclusion of distinguished and diverse experts in consumer affairs. The criteria focused on individuals with demonstrated domain knowledge and a profound grasp of the complex regulations and processes governing dispute resolution. By strategically selecting participants with deep expertise and hands-on experience, the study aimed to gather rich, interpretable data from multiple perspectives, enabling the identification of potential improvements in these mechanisms to foster broader participation and more effective outcomes.

Figure 1: Main issues discussed during interviews

Data Analysis

Data analysis was undertaken by following the six stages of thematic analysis, as proposed by Braun & Clarke (2006). QDA Miner Lite software was used to facilitate the process, ensuring the streamlined organisation and retrieval of coded data. The analysis stage also involved a thorough examination of relationships between codes, fostering the emergence of broader themes and sub-themes that reflected the underlying patterns within the data. Subsequently, the identified themes were defined to provide a clear understanding of their specific representation within the data. Finally, clear and meaningful names were assigned to each theme, capturing their core concept and facilitating effective communication.

Results

The study presents significant findings from the eleven in-depth semi-structured interviews conducted with prominent stakeholders in the dynamic realm of the consumer protection community. Rigorous analyses, including statistical tests, were employed to extract and report insights, with results meticulously examined to reveal the complexities of consumer protection. Key themes were identified throughout this process, detailed in Figure 2, providing valuable insights into the dynamics of consumer protection.

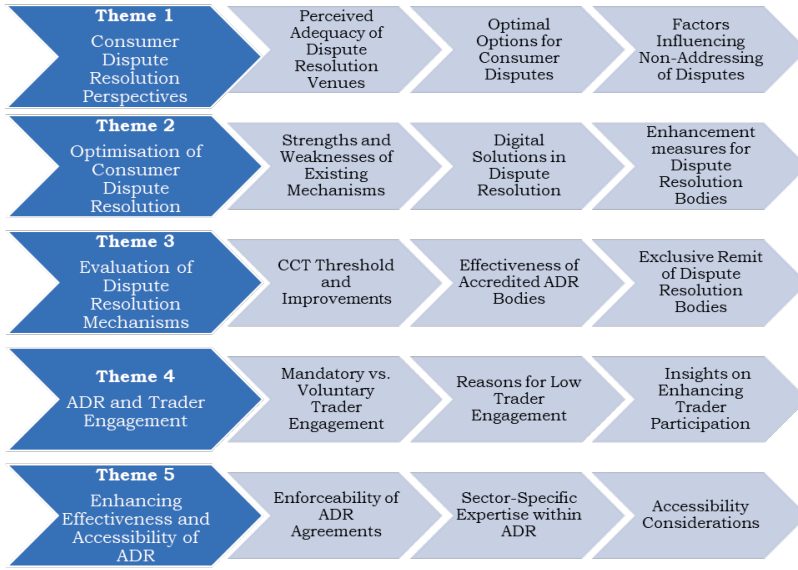


Figure 2 - Thematic Analysis Map

Theme 1 - Consumer Dispute Resolution Perspectives

1. Perceived Adequacy of Dispute Resolution Venues

Interviewees recognized various mechanisms for handling consumer disputes, but opinions on effectiveness were mixed. Key impacting factors included: consumer willingness to resolve disputes, accessibility, and awareness. Practicality was questioned due to lengthy resolution times and tailored mechanisms were recommended for specific issues. Some stakeholders emphasized the benefits of mediation over litigation, noting its cost-effectiveness and efficiency, but others highlighted a preference for litigation in certain sectors.

2. Optimal Options for Consumer Disputes

Consumer DRMs in Malta and the EU range from informal mediation to formal legal procedures, depending on complexity, amount involved, and engagement willingness. Malta's authorities facilitate amicable settlements, offering streamlined processes compared to civil courts. Softer mechanisms like mediation are recommended for simpler disputes, while formal litigation is necessary for complex cases. ADR is less time-consuming and cheaper, but its effectiveness is questioned. Limited awareness among consumers and traders remains a hurdle, with factors such as digital literacy and urgency also influencing the choice of mechanism.

3. Factors Influencing Non-Addressing of Disputes

Despite the availability of various DRMs, many consumers hesitate to seek redress due to time-consuming processes, lack of timely resolution, and frustration. The amount of claim and consumer background, such as busy schedules and limited resources, also play a role. Lack of knowledge about legal rights and complaint procedures, perceived complexity of lodging complaints, and fear of conflict or retaliation further deter consumers.

Theme 2 - Optimisation of Consumer Dispute Resolution

1. Strengths and Weaknesses of Existing Mechanisms

The strengths of existing consumer DRMs include enhanced accessibility and affordability, thanks to Malta's small size. Weaknesses include concerns about expertise in certain ADR processes, leading to potential inefficiencies. Current procedures also have limitations, such as the 30-day closure period for unresolved cases on the ODR platform and the complexity of legal proceedings, which can delay resolution and impose financial burdens on consumers.

2. Digital Solutions in Dispute Resolution

Advancements in digital technology offer opportunities and challenges for CDR. Digital-friendly options streamline processes and boost engagement, yet concerns persist about the digital divide and the need for physical contact options. Artificial Intelligence (AI) can simplify legal documents, improving accessibility, while visual aids aid comprehension across diverse educational backgrounds. Online hearings and virtual platforms provide convenience but must cater to vulnerable consumers without digital access. A robust digital infrastructure, including chatbot support, virtual hearings, and blockchain for secure records, is essential to enhance dispute resolution efficiency and accessibility.

3. Enhancement Measures for Dispute Resolution

Experts recommend several enhancements for CDR, emphasizing proactive measures and efficient processes, suggesting the shifting of perspectives and communication improvements with traders. Using social media for transparency, public decisions, and "name-and-shame" tactics for repeat offenders can promote effective resolutions. Streamlined procedures and swift resolutions are essential, contrasting court-related complexities with ADR mechanisms' efficiency. Verifying traders' identities before disputes prevents frivolous claims. Educational campaigns, promoting ADR awareness among consumers and traders are vital for improving dispute resolution processes.

Theme 3 - Evaluation of Dispute Resolution Mechanisms

1. CCT Threshold Updates and Improvements

Increase in CCT threshold from €5,000 to €10,000 has mixed reactions. Many view it positively due to rising prices, aiding effective handling of claims for items like solar systems and furniture. However, concerns about delays and adherence to legal timelines persist. Increased threshold should expedite resolutions, with suggestions for online filing and awareness campaigns. Experts propose full-time legal support for significant cases. Additionally, a minimum threshold for claims is recommended to avoid processing trivial cases that do not justify the associated costs.

2. Effectiveness of Accredited ADR Bodies

Accredited ADR bodies are seen as cost-effective and efficient alternatives to traditional court proceedings, delivering swift outcomes. These bodies complement the judiciary, allowing consumers to lodge complaints without formal court processes. However, concerns exist regarding their informal procedures and lack of mandatory participation, suggesting obligatory engagement in B2C disputes initiated by consumers. Public understanding of compliance with ADR decisions is also low, necessitating educational campaigns to increase utilisation. Sector-specific ADR bodies are valued for their expertise, especially in complex cases like financial services, and are noted for their ability to deliver fair decisions.

3. Exclusive Remit of Dispute Resolution Bodies

The insights gathered from interviews reveal a diverse spectrum of opinions among participants. Some advocate for mandatory application of some mechanisms for specific disputes, whilst others underscore the importance of preserving consumer choice and constitutional rights, as illustrated in Figure 3.

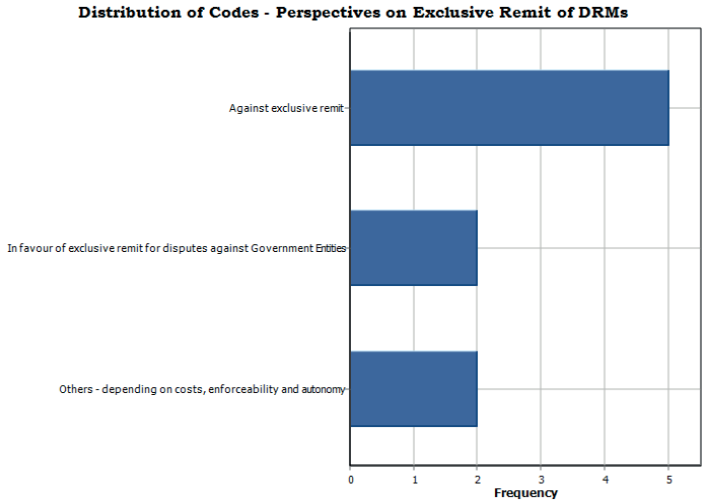


Figure 3 – Perspectives on exclusive remit of DRMs

Theme 4 - ADR and Trader Engagement

1. Low Trader Participation

Traders' reluctance to engage in ADR mechanisms stems from several factors, including lack of faith in the system, discomfort with addressing complaints, and a primary focus on profitability. Many traders view dealing with consumer problems as time-consuming and a waste of resources. Additionally, there is lack of information and understanding regarding ADR processes and their benefits, leading to fears of complexity and high costs.

2. Voluntary versus Mandatory Trader Participation

Debates over voluntary, versus mandatory trader participation in ADR processes revealed varied opinions, as illustrated in Figure 4 below.

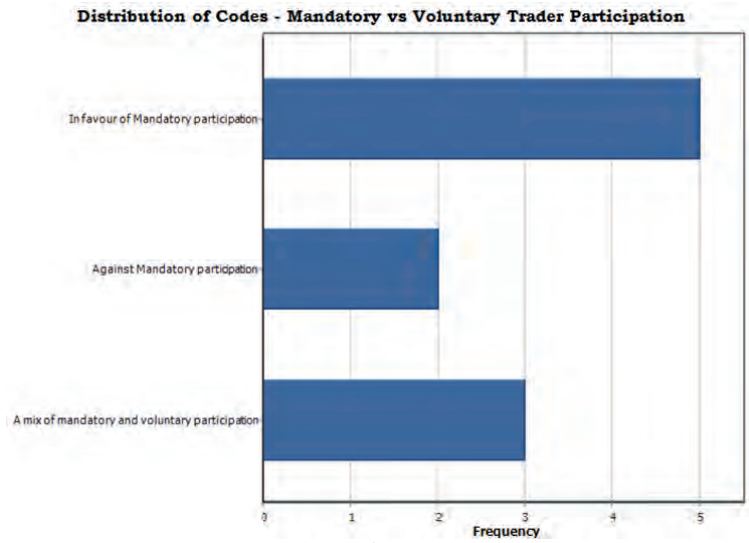


Figure 4 - Mandatory vs Voluntary Trader Participation

Whilst some advocate for mandatory participation across all sectors, others worry that mandatory participation could undermine the voluntary nature of ADR and generate ineffectiveness. Strengthening frameworks like the CCT is advised before mandatory participation, with gaming sector success suggesting broader implementation to boost transparency, accountability, and consumer empowerment.

3. Insights on Enhancing Trader Participation

Recommendations to enhance trader participation in ADR include educating traders about benefits and processes of ADRs, highlighting cost savings, and reputational benefits thereof. Transparent fee structures and incentives, such as advertising traders' willingness to participate in dispute resolution, are suggested to enhance consumer trust and boost sales. Additionally, mandatory participation is proposed to ensure prompt and efficient dispute resolution, reduce burdens on courts, and promote a culture of proactive resolution.

Theme 5 - Enhancing Effectiveness and Accessibility of ADR

1. Enforceability of ADR Agreements

Opinions on making ADR agreements legally binding varied. Some stressed the importance of enforceability to ensure compensation for consumers, whilst others voiced concern about undermining ADR's voluntary and collaborative nature. Balancing enforceability with flexibility was deemed crucial.

2. Sector-Specific Expertise within ADR

There were mixed views on whether ADR bodies should be sector-specific or general. Sector-specific bodies were seen necessary for complex sectors such as financial services, whilst general ADR bodies with access to a pool of experts were suggested to avoid excessive complexity and costs. A hybrid model combining both approaches was recommended for effective redress and fairness.

3. Other Accessibility Considerations: Current Cross-border Mechanism and Potential Solutions

Cross-Border Dispute Resolution: ECC-Network

The ECC-Network's role in facilitating cross-border consumer disputes received mixed feedback. Some interviewees praised its importance and effectiveness, while others called for more awareness and better promotion of ECC services in Malta. Gathering intelligence on the types of complaints handled by ECCs was suggested to enhance their effectiveness further.

Centralised Advisory Service

Opinions on establishing centralised advisory services for consumer disputes were diverse. Some believed that MCCAA and ECC Malta already fulfil this role, while others supported the idea of centralised services to simplify processes and increase awareness. Emphasizing consumer education and leveraging current support systems were also recommended to ensure informed decision-making and fair treatment for consumers and traders.

Discussion

Analysing Consumer Dispute Resolution Mechanisms

This study shows that consumer DRMs in Malta highlight a well-developed infrastructure. Despite availability of various mechanisms, concerns on effectiveness persist, particularly time constraints and lack of awareness, affecting accessibility and practicality.

Interviewees praised the DRMs offered by the OCA, CCT, ECC, and OAFS for their cost and time efficiency, compared to formal litigation, and the significant number of 2,326 new claims opened in 2022 shows consumer willingness to use these mechanisms (MCCAA, 2023a; OAFS, 2023). However, bridging the gap between the availability of these mechanisms and their perceived effectiveness is necessary. Adding more arbiters to the CCT increased the number of judgments, but timely resolutions remain challenging due to backlogs.

Effective CDR requires balancing the dispute nature, legal culture, and parties' willingness to engage. Formal avenues suit complex cases, while mediation and conciliation appeal to simpler disputes. Promoting ADR mechanisms and enhancing accessibility and efficiency of processes through public awareness campaigns can empower consumers and encourage broader use.

CDR methods vary within Malta and the EU, encompassing informal mediation and formal, legal avenues. Preferences for specific methods, such as conciliation services by the OCA, are influenced by accessibility, efficiency, and cost-effectiveness. Statistics indeed show that the OCA's conciliation procedure is the procedure most sought by consumers as confirmed by the complaints registered in the last three years as illustrated in Table 2 below.

	2020	2021	2022
Number of complaints registered:	1270	1100	1187
Settled amicably	409	414	468
Information only cases	152	66	117
Withdrawn or discontinued by consumer	172	157	167
Non-actionable	76	14	15
Referred to CCT	253	317	311
Pending by end of year	208	132	109

Table 2 – OCA complaints statistics 2020 to 2022 (Source: MCCAA annual reports (MCCAA, 2021; MCCAA, 2022; MCCAA, 2023a))

In comparison, the ECC plays a significant role in cross-border disputes, often resolving complaints amicably or referring them to accredited ADR bodies (MCCAA, 2023a). The Centre's significance in consumer protection and dispute resolution is highlighted by the substantial caseload presented in Table 3 below.

	2020	2021	2022
Complaints received:	395	264	286
Maltese consumers against EU traders	261	158	146
EU consumers against Malta based traders	134	106	140
Amicably resolved	175	178	154
Unfounded cases	27	29	24
No amicable agreement reached (referred to ADR body or ESCP)	98	132	95
Pending by end of year	-	35	59

Table 3 – ECC Malta case statistics 2020 to 2022 (Source: MCCAA annual reports (MCCAA, 2021; MCCAA, 2022; MCCAA, 2023a))

Despite the range of available mechanisms, consumer reluctance to seek redress remains a significant issue. Concerns about lengthy resolution periods, limited awareness of rights and remedies, and factors such as claim value, socio-economic status, and conflict aversion deter consumers from addressing disputes. Aligning with existing research and the 2022 Consumer Conditions Scoreboard, findings suggest the need for tailored interventions. Strategies could include streamlining dispute resolution processes, enhancing consumer education, and implementing measures to alleviate concerns about conflict and retaliation (European Commission, 2023a; Hogarth & Hilgert, 2004).

Enhancing Consumer Redress: Insights and Strategies

An analysis of Malta's consumer DRMs reveals both strengths and weaknesses, as follows:

- Strengths - accessibility, affordability, and efficiency, particularly in mechanisms provided by MCCAA (MCCAA, 2021; 2022; 2023a).
- Weaknesses - limited personnel proficiency, complex CCT process, and 30-day automatic closure on ODR platform (European Commission, 2019).

Addressing these weaknesses, interviewees suggested enhancing the expertise of ADR bodies' personnel and streamlining the CCT process. Digital solutions offer significant opportunities for convenience and accessibility, whilst AI simplifies legal documents and provides guidance. However, the digital divide remains a concern, and maintaining non-digital channels is crucial. The human element is also essential in resolving complex cases, highlighting the need for balanced approaches between technology and traditional methods.

Strategies for enhancing DRMs emphasize proactive measures, efficiency, and transparency. Regulatory bodies should foster early intervention in potential disputes through conciliation efforts and legal support. Streamlining administrative procedures and educational campaigns can promote the use and confidence in ADR mechanisms. Transparency can be enhanced through public announcements and potentially a "name and shame" approach for repeat offenders, mirroring the authority granted to the DG(OCA) to issue public warnings against non-compliant traders (MCCAA, 2023b). Verifying trader identities before entering dispute resolution processes is essential to ensure trader legitimacy and safeguard consumers, underscoring the importance of consumer education about engaging with traders who fully disclose their identities and contact details (Consumer Rights Regulations, 2014).

Analysing Dispute Resolution Mechanisms in Malta

The increase in the CCT threshold from €5,000 to €10,000 has elicited mixed responses. Some view it as economically aligned for larger claims, but delays and awareness gaps remain. Proposals include implementing online filing and social media campaigns to address these issues. The CCT expanded its arbiter panel from four to six in 2023 to manage potential case surges, tackling backlogs exacerbated by COVID-19 (MCCAA, 2021; 2022; 2023a; 2024). Despite CCT successes, stakeholders raised concerns about potentially exceeding magistrates' competence.

Accredited ADR bodies show potential for efficient and cost-effective dispute resolution compared to courts, adhering to a 90-day resolution timeframe as per the ADR Directive. However, challenges include public understanding of compliance and variable effectiveness depending on the claim. Proposals suggest mandatory engagement for consumers and traders in B2C disputes, recognizing formal structures like CCT as essential backups. Public education campaigns can raise awareness of ADR benefits, emphasizing time and cost savings.

Sector-specific ADR bodies, such as OAFS for financial disputes, have seen success, handling 638 minor and 151 formal cases in 2022 (OAFS, 2023). However, uptake remains low for MCCAA's residual ADR body, with only 22 cases registered in 2022 (MCCAA, 2023a). Effective ADR requires specialization and impartiality to ensure fair decisions, with informal negotiation and mediation preserving goodwill.

Mandatory DRMs are debated. Some advocate for mandatory mechanisms in specific cases for efficiency, while others prioritise consumer choice and access to courts. Concerns about mandatory arbitration or mediation include costs and limited consumer choice. Proposals suggest mandatory mechanisms for disputes with government entities, while commercial disputes retain various resolution options. Arbitration fees, set by the Arbitration Rules, 2004, raise affordability concerns, with a base fee of €69.88 plus additional administrative and arbitrator fees. Critiques also noted that mandatory arbitration can lead to constitutional doubts and litigation (Scerri Diacono & Bartolo, 2013).

Trader Participation in ADR Mechanisms

Several factors contribute to the low participation rate of traders in ADR mechanisms, including scepticism about the system's efficacy, discomfort with complaints, and perceived practical challenges. Traders' scepticism often stems from prior experiences with lengthy resolution procedures and a hesitancy to admit fault, especially among small businesses. Inadequate knowledge about ADR processes and perceived complexity and costs further deter trader participation. Limited trader involvement is evident nationally and across the EU. The MCCAA's residual ADR body reports significant trader non-participation, mirroring EU data from the 2019 Consumer Conditions Scoreboard, which shows only 31% of EU retailers willing to use ADR, with 43% unaware of its existence (European Commission, 2019).

Trader involvement in ADR spans arguments for both mandatory and voluntary participation. Advocates of mandatory participation stress its role in ensuring fair outcomes and bolstering consumer trust. Successful implementations in gaming demonstrate potential to enhance transparency and accountability. However, opponents caution that mandatory participation could undermine ADR's voluntary nature and impede effective mediation. Concerns also include potential burdens on ADR entities and conflicts with constitutional rights in some EU states (European Commission, 2023b). In Malta, mandatory trader participation is enforced in sectors like gaming and financial services.

Interviewees emphasized targeted educational approaches towards traders, to disseminate information and advocate ADR use. Highlighting ADR benefits, such as cost savings and faster resolution times compared to litigation, and showcasing reputational benefits for engaging traders can incentivize participation. Clearly outlining ADR fee structures builds trust, whilst providing clear steps for initiating ADR, and strengthening technical competence within existing ADR processes can enhance procedural fairness and attractiveness for traders.

Strengthening ADR in Malta: Analysing Enforceability, Expertise, and Accessibility

The discourse on legal enforcement of ADR agreements revealed diverse viewpoints. Some interviewees advocated enforceability for benefits such as fairness and timely compensation, while others feared it could compromise ADR's voluntary nature. The OAFS successfully balances enforceability and voluntariness by prioritising mediation and only resorting to binding decisions if mediation fails, illustrating a potential model for other sectors (Arbiter for Financial Services Act, 2017).

The debate between sector-specific and general ADR bodies hinges on the need for expertise versus practical implementation. Proponents argue that sector-specific bodies, especially in complex areas like financial services, ensure fairer resolutions due to their specialized knowledge (Vickers, 2022). Hodges (2019) suggests restructuring ADR entities by sector to establish national networks with specialized expertise, reducing consumer confusion. However, concerns about the feasibility and cost of maintaining sector-specific expertise, particularly in smaller jurisdictions like Malta, were raised.

The ECC-Net plays a significant role in aiding consumers with cross-border disputes, providing crucial information and guidance for efficient dispute resolution (Csiszár, 2016). It offers free case-handling services and directs consumers to out-of-court solutions like ADR bodies or ESCP when necessary (ECC Malta, 2022). However, awareness of ECC-Net's services is low, especially in Malta, necessitating intensified awareness campaigns.

Opinions varied on establishing a centralised advisory service for consumer disputes. Some supported it, while others suggested leveraging existing resources like MCCAA and ECC, which already provide substantial assistance, evidenced by encouraging statistics on enquiries (MCCAA, 2021; 2022; 2023a). Proposals included a portal-like system to direct consumers to appropriate entities, similar to Belgium's Consumer Mediation Service (De Koning, 2021). Prioritizing consumer education was also emphasized, since balancing a centralised support system with education initiatives ensures accessibility and effectiveness in resolving disputes.

Conclusions

It is evident that the Maltese CDR landscape is multifaceted and dynamic, characterised by diverse mechanisms and stakeholders. The analysis revealed several key insights into effectiveness and challenges of these mechanisms. The study highlighted the importance of accessibility and awareness in CDR. Despite the availability of various mechanisms, there remains a need to enhance consumer awareness and accessibility to ensure effective utilisation of resources. Efforts to improve public education and streamline access to dispute resolution services could significantly enhance consumer outcomes.

Furthermore, the findings underscored the significance of sector-specific expertise in resolving complex disputes, particularly in areas such as financial services and telecommunications. Sector-specific accredited ADR bodies emerged as valuable resources, leveraging deep industry knowledge to facilitate fair and efficient dispute resolution. Additionally, the study shed light on the potential benefits of mandatory participation for traders in dispute resolution processes. While mandatory participation may pose challenges, such as enforcement and compliance issues, it could also promote transparency and accountability, ultimately benefiting both consumers and traders.

Integrating digital solutions, including AI-powered tools, offers promising enhancements for CDR efficiency and accessibility. Digital platforms streamline processes, improve communication, and provide easier access to information. AI-powered chatbots can guide consumers on dispute resolution options and answer FAQs. AI can also analyse case data to identify patterns and improve outcomes. To maximize digital ADR benefits, addressing digital literacy gaps is essential for inclusivity. Traditional methods should be maintained to avoid marginalizing non-digital consumers, and the human element must be preserved to offer personalized assistance when needed.

To optimize CDR in Malta, a comprehensive approach is essential, focusing on consumer education, sector-specific expertise in ADR, exploring mandatory participation, and leveraging digital tools. Recommendations include launching targeted awareness campaigns via social media and educational platforms, educating businesses on effective complaint handling and ADR benefits, and ensuring fairness in dispute resolution clauses. A centralized online portal could streamline access to DRMs, offering guidance tailored to consumer needs and enhancing transparency. Implementing mandatory trader participation in critical sectors like travel and telecommunications, along with expanding sector-specific ADR schemes, will bolster expertise and efficiency. Improving the CCT involves simplifying procedures for very small claims and providing legal aid for complex cases, aiming to reduce backlog and ensure equitable access to justice. These measures collectively aim to enhance consumer confidence, fairness, and efficiency in dispute resolution across Malta's consumer market.

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Conflict of Interest

The researcher's employment with the national consumer regulatory body posed a potential limitation. To address the potential bias associated with the researcher's background, a heightened awareness of this risk was maintained throughout the research process.

Authorship

Grace Stivala – 70%
Owen Bugeja – 30%

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06 Project Success – Main Causes of Project Delays and the Extent of the Improvement by the Application of the Critical Chain

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Abstract

Objectives: The study aims to reveal the key project delay factors and how these may be mitigated by applying Critical Chain Project Management to achieve project success by improving the project timeline.

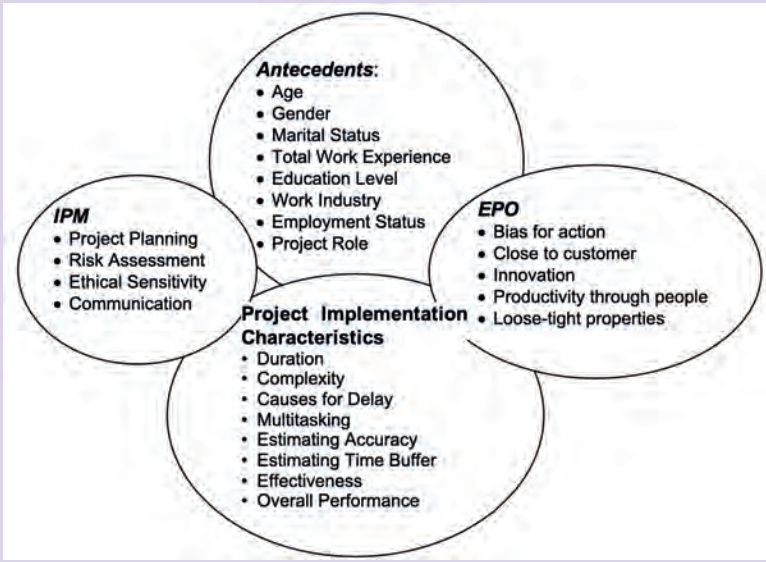
Methods: Project planning aspects, including complexity, reasons for delays, time estimates incorporating buffers, and the impact of multitasking are examined. This quantitative study ascertains whether a relationship exists between these aspects, Interprofessional Project Management (IPM) and Employee Perception of the Organisation (EPO).

Results: Findings suggest that the project planning, ethical values dimensions of IPM, and excessive use of time buffers impact project management performance. Furthermore, project timelines have high dependency on project time buffering due to multitasking.

Conclusions: Critical Chain Project Management will likely improve timelines providing that the foundations of project management are robust with better scoping, clear project deliverables, adequate resources and experience, suitable change management practices, and mitigating multitasking for core project stakeholders. Findings suggest that a key cause of project delay is multitasking itself.

Keywords: "Critical Chain Project Management"; "Multitasking"; "Critical Success Factors."

Highlights:
- Multitasking and time buffering are costly in monetary and non-monetary terms.
- Effective leadership is essential for optimising project execution.
- How employees perceive their organisation impacts project performance.



Graphical Abstract: Perceived Project Success Characteristics Relationships

Introduction

A study related to software development projects by The Standish Group (2023) found that merely 31% of the projects are successful and only 46% result in high-value returns. Additionally, a Project Management Institute (PMI) survey revealed that only 52% of projects were delivered on time, and 69% did not meet the scope and goals (Madsen, 2019). These findings and other similar project success rating studies by various journals and institutions suggest that the meaning of the word 'success' requires amplification. The word 'success' tends to be a broad and illusive term (Camilleri, 2011). Hence, defining 'success' is viewed as being essential for understanding the added value that projects bring about.

Furthermore, notwithstanding the advancement in methodologies surrounding project management and the specialisation of project managers in recent years, the success rate for implementing projects across industries still leaves much to be desired. Essentially, a project implementation cycle consists of several phases, namely project initiation, planning, execution, monitoring and control, and the eventual project closure. Additionally, a project implementation cycle is influenced by leadership, agility, team flexibility, a skilled and experienced working team, conflict management, change management and effective communication. These factors all play an important role in successfully delivering a project. Moreover, these factors influence and promote organisational culture and complement each other in the way projects move forward from one phase to another. Such a process is critical when one takes into consideration that organisational culture is the set of values, beliefs, attitudes, systems, and rules that outline and influence employee behaviour within an organisation.

In their research, Roberts and Furlonger (2000) found that adopting a suitable and disciplined project management methodology improves productivity by 20% to 30%. This improvement may be achieved using appropriate project documentation such as a meaningful project charter and scope, clear roles and responsibilities, well defined objectives and goals, resource requirements, efficient scheduling and estimation, effective communication, skilled project team, and clear control of the various project tasks, amongst others (PMBOK, 2017).

Theoretical Framework

Critical Success Factor (CSF) Approach

In project management, CSFs are the critical aspects of a project considered most essential to its success or failure. Various project management research studies identify several CSFs that may impact the implementation of projects to predict and mitigate possible causes of project delays. Whilst the most important CSFs in project management are related to goal definition and direction; team competencies; clear roles and responsibilities; communication and involvement; and adherence to budget, timeframe, and performance criteria, there are many other factors that contribute to successful project management. Hence, due to the numerous traits contributing to CSFs in project management, this research study places special emphasis on CSFs and aims to identify the main causes of project delays, and the relationship with other aspects such as leadership and management.

Additionally, the research will analyse the characteristics of the key resources within the project chain, and how the number of time buffers may impact estimating task scheduling. This will aid to establish the effectiveness of task scheduling and the overall effectiveness of project management timelines. Moreover, this research also explores the relationships between the organisation's attitude towards several factors, namely project effectiveness, project complexity, issues related to project implementation, and the employee perception of the organisation (EPO). EPO reflects the work environment in terms of the organisation's tendency towards being biased for action; close to the customer; innovative (autonomy and entrepreneurship), believes in its employees, and having loose-tight properties (flexibility). Thus, assessing the extent the organisation is forward-looking and the effectiveness of its leadership and management team.

Critical Chain Project Management (CCPM)

CCPM is a project management technique that prioritises the successful completion of projects by focusing on efficient resource utilisation. This technique was initiated by a business management consultant, Eli Godratt in 1997, and adopted by global brands such as Procter and Gamble, NASA, and Texas Instruments. Godratt (2002) viewed the Critical Chain as the longest path in the project schedule and considered activity interdependence and resource constraints. In other words, CCPM examines the project schedule, and then determines which set of activities that, if delayed, will extend the end date of the project. This is somewhat different from the traditional critical path method (CPM), which assumes the availability of all resources simultaneously and is therefore viewed as an approximation. On the other hand, the CCPM method studies limited resources and optimises their utilisation to create a more realistic timeline.

Projects using a critical chain approach will outline task dependencies and resource constraints at the time of planning the project and establish an ideal project workflow. The approach will add extra resources to the project if required and once this is done, project managers can track progress based on whether the available resources have been utilised. Hence, if a project has not used any additional resources than the resources allocated, then the project team are deemed to be doing better than the team that has utilised additional resources. Leach (1999) maintains that to deliver projects, the critical chain ensures a project is immune from reasonable common-cause variations.

Godratt (2002) illustrates that when compared to the traditional methods of implementing projects, the reengineering of project scheduled tasks within the critical path to the critical chain offers more value to project management, particularly with added efficiency, more focus, shorter project delivery time resulting in an increase in project success. However, the critical chain must be complemented with other project management aspects. For example, lack of planning will nonetheless have its negative effects and repercussions under the critical chain methodology. Newbald (2011) found that CCPM increased the speed of implementing a project by 30%, with a predictability of time to completion by more than 90%. Additionally, he found that the CCPM approach resulted in less stress, errors and wasted time for the project team.

Project success rates using traditional methods have been shown to be disheartening. Spradley (2022) contends that on average, 70% of projects fail in one way or another for various reasons, namely:

- Not enough detail in project scope and charter.
- Wrong estimating.
- Lack of detail in the WBS.
- Insufficient resources.
- Poor quality and lack of skillset with key personnel.
- Lack of experience with resources.
- Mismanagement of stakeholder engagement.
- Inadequate risk management measures, amongst others.

Pullicino (2022) argues that a major drawback in traditional project management methods is that estimates are established with a safe frame in mind (i.e., high probability of achievement). Hence, there is a tendency to factor time buffers to cover common cause variations and allocating greater multitasking. Pullicino (2022) contends that this leads to waste and inefficiency. In addition, he maintains that the common practice of offering no incentives for finishing early and of unwanted pressure/stress for finishing late further inflates the estimates.

Pullicino (2022) asserts that the critical chain method has evolved from the critical path approach and seeks to address common issues in project management by being leaner and smarter in the way projects are planned and managed. One must recognise that the critical chain and critical path methods are very different. The critical path method focuses on a single sequence of the essential project tasks and permits project teams to identify the ideal workflow to ensure the successful completion of a project within its estimated timelines and removes any task that is not included on the critical path from the priority list. On the other hand, the critical chain methodology places the greatest importance on the resources required to complete a project with the excess resources being included in the project to act as resource buffers. Thus, if the project team has not utilised any of the resource buffers, it is viewed as moving ahead successfully. Hence, while the critical path focuses on project scheduling, the critical chain is more focused on the resources needed to complete the project.

Pullicino (2022) claims that resources should be identified and allocated along the critical chain with clear prioritisation where no conflict exists as to which work needs to be done first. Mayor (2010) argues that the major benefit of the critical chain is its provision of greater stability in project management when compared to traditional project management techniques. Finally, Leach (1999) argues that the CCPM is founded on system thinking and the theory of constraints, which means that the constraint (bottleneck) is not on the critical path but on the human resource practices. Additionally, Mayor (2010) claims that focusing more on the root cause of the various issues in the critical chain will begin to resolve the concern with project resource levelling and eliminate multitasking. This is somewhat confirmed by Ernst & Young (2020) in their survey, which reveals that 93% of project success is attributable to implementation focus and clear objectives.

Methodology

Sample and Design of the Study

A theoretical model that forms the basis of our empirical study and is grounded upon the above literature review is shown at Figure 1. The theoretical model depicted in Figure 1 was assessed by the administration of a survey. The survey represents a snapshot of the respondents' perceptions regarding the various aspects included in our study. The survey posed 59 questions which were coded and transformed into the respective variables so that they may be analysed to address the defined research questions. The coded data also permitted the computation of the relationships between the variables. The participation to the survey was voluntary and anonymous. Being a deductive approach, questions were closed-ended and where possible questions were randomised and reversed. This was performed to enhance the probability and uniformity of the survey to ensure accurate, objective and unbiased results.

The survey was conducted in English and distributed through a reputable agency to an international population of potential respondents that were involved in managing projects, namely Malta, United Kingdom, Italy, Spain, and USA. The population size was undetermined, since the survey was open to unlimited number of respondents, which was computed at 385 for a 5% margin of error. Completed responses were received comprising of 90 respondents each from United Kingdom, Italy and Spain, 46 from Malta and 111 from USA, which amounted to a total of 427 valid responses. This response quantity gave a 4.74% margin of error. According to LoBiondo-Wood & Haber (2002) a confidence interval of ≤7% is acceptable.

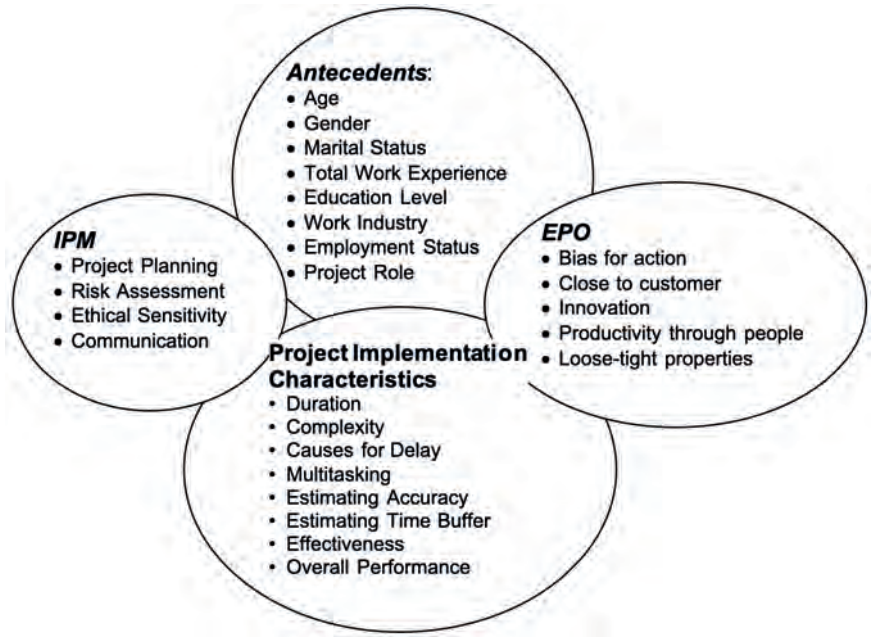


Figure 1. Conceptual Perceived Project Success Characteristics Relationships

The research questions depicted at Figure 1 include:

- What are the dominant attributes of the project implementation characteristics, IPM, and EPO?
- What is the relationship between the project implementation characteristics, IPM, and EPO and their associated dimensions?
- What is the relationship between the antecedents and the project implementation characteristics, IPM, and EPO and their associated dimensions?

This quantitative research study generally aims to identify the main causes of project delay and provides an insight of the interrelationships between various variables that play a relevant role within the project management context to reveal whether the application of the critical chain resolves the delay issue.

Operationalisation (Measures)

This section provides an overview of all measures that are included in our study. The items regarding project implementation characteristics and dominant antecedents (mainly demographic data) are based on single items respectively to collect relevant primary data items. Moreover, the utilised constructs, namely IPM and EPO measure several dimensions by using a Likert system rating scale, namely definitely disagree = 1; disagree = 2; don't know = 3; agree = 4; and definitely agree = 5. These two constructs were used in the present research to collect primary data. The details of all the measures are shown in Table 1.

Table 1. Details of the Tools and Measures Used in the Study

Variable	Definitions of variable
Project Implementation Characteristics	General project implementation attributes of project normally undertaken.
Normal project implementation duration	6 to 12 months; 12 to 18 months; 18 to 24 months; 24 months and over.
Project Implementation Overall Performance	Ahead of schedule; On-time; Up to 1 month after schedule; Between 1 month and 3 months after schedule; Between 3 months and 6 months after schedule; Over 6 months after schedule; Project discarded.
Project Implementation Complexity	% of Easy Projects [?]; % of Medium [?]; % of Complex [?]. Aggregate of percentages to equal 100%.
Project Implementation Causes for Delay	Rate extent of each from 0 to 10: Poor Project Leadership; Poor Project Management; Poor estimation of timelines; Poor estimation or quality of resources; Poor estimation of costs; Poor procurement management; Poor Contract Management; Poor scope and definition requirement documents; Ineffective Communication plan; Remote working environment; Overruns in Schedule development; Testing outcome which resulted from poor product delivery; Poor change management controls; Lack of training; Other (please specify and rate each).
Project Implementation Multitasking Level	Rate extent from 0 to 10: A typical day of work includes multitasking?
Project Implementation Multitasking Effectiveness Level	Less the 10%; Between 10% and 30% more efficient; Between 30% and 50% more efficient; Between 50% and 70% more efficient; More than 70%.
Project Implementation Estimating Accuracy Task Scheduling	Rate extent from 0 to 10: Inclusion of adequate buffers to get the job done on time?
Project Implementation Estimating Buffer Task Duration Scheduling	Less than 4 hours; Between 4 and 8 hours; Between 8 and 12 hours; Over 12 hours.

Table 1. Details of the Tools and Measures Used in the Study (continue)

Variable	Definitions of variable
Project Implementation Effectiveness	Up to 25% more effective; 25% more effective (a task that is normally scheduled for 5 days would be done in 3.75 days); 50% more effective (a task of 5 days would be done in 2.5 days); 75% more effective (a task of 5 days would be done in 1.25 days).
Interprofessional Project Management (IPM)	Having the skills to work in interprofessional project teams in which problems are addressed by teams drawn from multiple professions. IPM comprises of four dimensions.
Project planning (6 items)	An outline of the steps and resources necessary to achieve the project's objectives, including identifying the project's scope, establishing a timeline, assigning tasks and resources, and budgeting for the project.
Risk assessment (3 items)	A process used to identify potential threats and analyse what could happen if a threat occurs.
Ethical Sensitivity (4 items)	The means and capacity through which professionals strive to understand and compassionately respond to others.
Interprofessional Communication (7 items)	Communication among members of a project team, which may include members of various professional groups.
Adapted Source:	Tormey, R.; Laperrouza, M. (2023). The development, validation and use of an Interprofessional Project Management questionnaire in engineering education. *European Journal of Engineering Education, Vol 48, Issue 3, 502-517.*
Employee Perception of The Organisation	How employees view their working environment.
Bias for action	The degree the organisation is perceived to be flexible and quick in responding to problems.
Close to customer	The degree the organisation is perceived to give the customer top priority, that is, customer driven rather than production driven.
Autonomy & Entrepreneurship (innovation)	The degree the organisation is perceived to encourage and provides opportunities for employees to be creative and innovative in their daily work environment.
Productivity through people	The degree the organisation is perceived to truly believe in its employees.
Loose-tight properties	The degree the organisation is perceived to be flexible with employees but administers discipline when necessary.
Adapted Source:	Sharma, S., Netemeyer, R. G., & Mahajan, V. (1990). In Search of Excellence Revisited: An Empirical Evaluation of Peters and Waterman's Attributes of Excellence. In Bearden, W. O., & Parasuraman, A. (eds.), *Enhancing Knowledge Development in Marketing,* (Vol. 1, pp. 322-328). Chicago: American Marketing Association.

Table 1. Details of the Tools and Measures Used in the Study (continue)

Variable	Definitions of variable
Dominant Antecedents	***(Personal characteristics)***
Gender	The gender of respondent.
Age group	The age group of respondents (to nearest year).
Marital status	Whether respondents are married; widowed; divorced; separated; cohabiting with a significant other or in a domestic partnership; single, never married; or prefer not to answer.
Total years of experience	Total years of project management experience.
Education level	Secondary education (up to and including O Levels or equivalent); upper secondary education (Advanced level or equivalent); diploma or equivalent; degree or equivalent; masters or equivalent; doctorate or equivalent.
Work industry	Advertising & Marketing; Agriculture; Airlines & Aerospace, including defence; automotive; business support and logistics; construction, machinery and homes; education; entertainment & leisure; finance & financial services; food & beverage; government; health & pharmaceuticals; health & fitness; insurance; manufacturing; nonprofit; retail & consumer durables; real estate; telecommunications, technology, internet & electronics; transportation & delivery; utilities, energy and extraction; or prefer not to answer.
Employment status	Clerical support/analyst; supervisory support/analyst; managerial; executive level; consultant / professional; self-employed; retired; other (these need to be coded).
Project role	Project sponsor; project manager; business analyst; technical analyst; project team members including (engineer, designer, tester, etc.,); Other (these need to be coded).

Data Validity and Reliability

The validity and reliability of the data represented by the IPM and EPO constructs were achieved by using Factor Principal Component analysis, with Varimax rotation and Cronbach's Alpha respectively. Factor analysis has the objective to test the extent to which the constructs used actually measured what they were supposed to measure (Leech et al., 2015). The factor analysis provides a matrix where the underlying construct dimensions are revealed. Any questions that did not converge with their respective dimension were removed and measures adjusted to exclude the errant questions.

Data reliability was tested using Cronbach's Alpha, which assesses internal consistency and evaluates how closely a related a set of items are as a group. This test compares the amount of shared variance to the amount of total variance. The reliability test aims to confirm that the respondent's data give accurate and consistent measures. Table 2 provides details to how Cronbach's Alpha should be interpreted. Additionally, Table 3 and Table 4 show the outcome of the factor analysis and reliability computations. The validity and reliability computations suggest that the data for both constructs is valid and reliable.

Table 2. Interpretation of the Cronbach's Alpha Values (Cronbach, 1951)

Cronbach's Alpha	Internal Consistency
≥ 0.9	Excellent
≥0.8 to <0.9	Good
≥0.7 to <0.8	Acceptable
≥0.6 to <0.7	Questionable
≥0.5 to <0.6	Poor
<0.5	Unacceptable

Table 3. Interprofessional Project Management Factor Analysis: Rotated Component Matrix

Questions	Dimensions (Component Matrix)			
	Project Planning	Ethical Sensitivity	Risk Assessment	Interprofessional Communication
Project planning	**0.813**	0.331	0.337	0.272
IPM02	**0.752**	0.160	0.131	0.187
IPM04	**0.690**	0.253	0.262	0.119
IPM05	**0.671**	0.304	0.189	0.143
IPM03	**0.590**	0.303	0.333	0.181
IPM01	**0.590**	0.177	0.309	0.306
Ethical sensitivity	0.387	**0.836**	0.261	0.259
IPM11	0.181	**0.814**	0.182	0.144
IPM10	0.262	**0.730**	0.273	0.143
IPM12	0.337	**0.568**	0.211	0.244
IPM13	0.436	**0.453**	0.147	0.281
Risk assessment	0.444	0.278	**0.810**	0.170
IPM08	0.214	0.208	**0.790**	0.105
IPM09	0.315	0.266	**0.620**	0.213
IPM07	0.524	0.183	**0.507**	0.084
Interprofessional communication	0.491	0.352	0.408	**0.613**
IPM19	0.266	0.160	-0.008	**0.810**
IPM14	0.139	0.246	0.410	**0.593**
IPM18	0.156	0.389	0.422	**0.473**
Cronbach Alpha:	**0.887 Good**	**0.849 Good**	**0.865 Good**	**0.790 Acceptable**

Table 4. Employee Perception of the Organisation Factor Analysis: Rotated Component Matrix

Questions	Dimensions (Component Matrix)				
	Innovative	Productivity Thru People	Close to Customer	Bias for Action	Loose-Tight Properties
Innovative	**0.823**	0.366	0.285	0.225	0.225
Ep07	**0.798**	0.144	0.210	0.155	0.160
Ep01	**0.652**	0.363	0.296	0.150	0.184
Ep04	**0.619**	0.409	0.208	0.260	0.221
Productivity thru people	0.311	**0.851**	0.256	0.230	0.223
Ep02	0.306	**0.786**	0.177	0.211	0.174
Ep06	0.254	**0.749**	0.285	0.204	0.229
Close to customer	0.276	0.260	**0.885**	0.188	0.191
Ep08	0.345	0.090	**0.773**	0.127	0.195
Ep03	0.139	0.354	**0.763**	0.197	0.138
Bias for action	0.225	0.241	0.201	**0.904**	0.178
Ep05	0.225	0.241	0.201	**0.904**	0.178
Loose-tight properties	0.232	0.233	0.210	0.179	**0.903**
EP09	0.232	0.233	0.210	0.179	**0.903**
Cronbach Alpha:	**0.894 Excellent**	**0.924 Excellent**	**0.890 Good**	**N/A Single item**	**N/A Single item**

Results

Descriptive Statistics and Bivariate Correlations

Table 5 provides the descriptive statistics for the relevant variables that reveal their proximity to the normal distribution. In general, most of the collected data regarding the variables approximate the Normal Distribution due to the closeness of the Mean, Median, and Mode values, and the low dispersion measures of skewness and kurtosis. Furthermore, Tables 6 to 8 depict the correlations between the variables that will be used to determine their relationship to each other. These tables provide the relevant data to answer the three research questions defined previously.

Table 5. Key Descriptive Statistics for Respondents' Data

Key Variables	Mean	Median	Mode	Std. Dev	Skewness	Kurtosis
General Project Data						
Project Normal Duration	2.0	2.0	1.0	1.129	0.666	-1.017
Project Overall Performance	3.1	2.0	2.0	1.647	0.797	-0.364
Project Complexity - Easy	0.4	0.5	0.3	0.255	0.512	-0.216
Project Complexity - Medium	0.4	0.5	0.5	0.216	0.558	0.272
Project Complexity - Complex	0.4	0.5	0.3	0.262	0.486	-0.371
Dominant Complexity Level	1.9	2.0	2.0	0.779	0.098	-1.345
Project Causes for Delay						
Poor Leadership	5.3	5.0	5.0	2.978	-0.242	-0.831
Poor Project Management	5.2	6.0	6.0	2.954	-0.254	-0.939
Poor Time Estimates	5.6	6.0	8.0	2.736	-0.433	-0.503
Poor Resource Estimates	5.3	6.0	6.0	2.813	-0.347	-0.672
Poor Cost Estimates	5.0	5.0	7.0	2.887	-0.183	-0.919
Poor Procurement Management	5.1	5.0	5.0	2.808	-0.246	-0.692
Poor Contract Management	5.2	5.0	5.0	2.883	-0.254	-0.806
Poor Scope Definition	5.3	5.0	5.0	2.822	-0.292	-0.711
Ineffective Communication Plan	5.6	6.0	5.0	2.738	-0.317	-0.572
Remote Work Environment	4.5	5.0	0.0	3.182	-0.010	-1.150
Over runs in schedule development	5.3	6.0	5.0	2.697	-0.354	-0.570
Testing Outcomes	5.1	5.0	5.0	2.812	-0.268	-0.688
Poor change management	5.1	5.0	5.0	2.826	-0.221	-0.742
Lack of Training	5.1	5.0	5.0	2.883	-0.170	-0.824
Project multitasking						
Multitasking Level	6.3	7.0	7.0	2.588	-0.553	-0.206
Multitasking Effectiveness	3.1	3.0	3.0	1.014	0.015	-0.384
Project Estimating Accuracy						
Adequate Buffer	6.1	6.0	5.0	2.077	-0.265	-0.187
Buffer Hours Allocated	2.3	2.0	2.0	0.823	0.329	-0.344
Interprofessional Project Management						
Project Planning	3.9	4.0	4.0	0.731	-0.527	0.409
Risk Assessment	3.8	4.0	4.0	0.755	-0.367	0.041
Ethical Sensitivity	3.8	3.8	4.0	0.749	-0.400	0.094
Interprofessional Communication	3.8	3.9	4.0	0.676	-0.382	0.307
Overall IPM Score	3.8	3.9	4.0	0.652	-0.377	0.579
Employee Perception of Organisation						
Bias for Action	3.7	4.0	4.0	1.083	-0.641	-0.398
Close to Customer	3.7	4.0	4.0	0.889	-0.757	0.532
Innovation	3.6	3.7	4.0	0.895	-0.485	-0.140
Productivity through People	3.6	4.0	4.0	0.981	-0.619	-0.044
Loose Tight Properties	3.7	4.0	4.0	1.024	-0.716	0.013
Overall EPO Score	3.7	3.7	4.0	0.790	-0.493	0.339

Table 6. Correlations for the Antecedents, Project Implementation Characteristics, IPM and EPO

		Antecedents							
	Variables	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	Age	1.000							
2	Gender	.135**	1.000						
3	Marital Status	-.259**	-0.016	1.000					
4	Work Experience	.671**	.131**	-.166**	1.000				
5	Education Level	-0.017	0.057	-.120*	-0.005	1.000			
6	Industry Type	0.084	0.077	0.029	0.030	0.011	1.000		
7	Employment Type	0.035	-0.003	.109*	-0.041	-0.058	.132**	1.000	
8	Project Role	0.074	-.109*	.115*	0.023	-.126**	.161**	.238**	1.000
9	Project Normal Duration	.145**	.108*	-0.082	.151**	0.087	0.008	-0.001	0.014
10	Project Overall Performance	0.082	-0.008	-0.009	0.038	0.013	.096*	0.052	0.032
11	Project Complexity - Easy	-0.047	-0.048	-0.006	-0.011	-0.066	-0.024	-0.021	0.085
12	Project Complexity - Medium	-0.016	0.071	-.117*	-0.027	0.085	-0.005	-0.009	-0.091
13	Project Complexity - Complex	-0.083	0.035	-0.048	-.098*	0.076	-0.059	0.014	-.140**
14	Dominant Complexity Level	0.011	0.048	-0.027	0.034	.146**	-0.003	0.032	-0.045
15	Poor Leadership	-0.019	-0.016	-0.091	-0.059	0.068	0.006	-0.063	-0.048
16	Poor Project Management	-0.035	0.008	-0.028	-0.065	0.013	-0.022	-0.067	-0.090
17	Poor Time Estimates	0.005	-0.026	-.152**	-0.009	0.086	-0.087	-.152**	-.126**
18	Poor Resource Estimates	0.014	0.062	-0.074	-0.033	-0.018	0.000	-0.088	-.171**
19	Poor Cost Estimates	0.027	0.027	-0.094	-0.050	0.027	0.024	-0.071	-.148**
20	Poor Procurement Management	-0.057	0.044	-0.062	-0.078	-0.017	-0.021	-0.030	-.138**
21	Poor Contract Management	-0.056	0.027	-0.043	-0.090	-0.004	-0.030	-0.076	-.154**
22	Poor Scope Definition	0.020	0.063	-0.094	-0.033	0.056	-0.016	-0.039	-.117*
23	Ineffective Communication Plan	-0.005	-0.010	-.107*	-0.028	0.010	-0.036	-.103*	-.109*
24	Remote Work Environment	-0.054	0.026	-0.065	-.137**	-0.069	-0.056	-0.020	-.143**
25	Over runs in schedule development	-0.035	0.039	-0.031	-0.081	-0.016	-0.047	-.122*	-.131**
26	Testing Outcomes	0.042	0.057	-0.045	-0.054	-0.026	0.043	-0.063	-.143**
27	Poor change management	-0.038	0.005	-0.038	-0.069	0.045	0.016	-0.046	-0.071
28	Lack of Training	-0.026	-0.011	-0.069	-.096*	0.011	-0.021	-.130**	-0.092
29	Multitasking Level	0.070	-0.039	-0.038	.128**	.113*	-0.042	-.158**	-0.090
30	Multitasking Effectiveness	-0.086	-0.031	-0.010	0.061	0.069	-0.091	-.176**	-.101*
31	Adequate Buffer	0.058	0.094	-0.066	0.047	0.024	-0.034	-.123*	-.139**
32	Buffer Hours Allocated	0.013	-0.041	-0.052	0.044	.114*	0.002	0.003	0.003
33	Estimating Effectiveness	0.032	0.040	-.128**	0.046	.135**	-0.082	-.099*	-0.087
34	IPM Project Planning	0.086	0.049	-0.009	.236**	.129**	-0.032	-.132**	-.114*
35	IPM Risk Assessment	0.057	0.072	-0.074	.158**	.099*	-0.092	-.154**	-.179**
36	IPM Ethical Sensitivity	0.086	0.047	-0.023	.179**	.173**	-0.063	-.146**	-0.031
37	IPM Interprofessional Communication	.104*	0.082	-0.058	.250**	.153**	-0.025	-.180**	-.144**
38	Overall IPM Score	.108*	0.065	-0.048	.243**	.157**	-0.042	-.176**	-.123*
39	EPO Bias for Action	-0.023	0.083	0.025	0.020	0.035	-0.063	-0.037	0.030
40	EPO Close to Customer	0.022	0.055	-0.029	.132**	.131**	-0.057	-0.062	-0.089
41	EPO Innovation	0.070	0.066	-0.014	.107*	.100*	-0.084	-0.064	-0.008
42	EPO Productivity through People	0.001	0.066	0.026	0.042	.105*	-0.007	-0.044	-0.059
43	EPO Loose Tight Properties	0.022	0.003	0.013	.122*	0.066	-0.059	-0.018	-0.028
44	Overall EPO Score	0.037	0.071	-0.005	.106*	.107*	-0.053	-0.053	-0.031

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table 7. Correlations for Causes of Project Delay, Project Implementation Characteristics, IPM and EPO

	Project Implementation Causes for Delay													
Variables	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
Causes of Project Delay														
15 Poor Leadership	1.000													
16 Poor Project Management	.747**	1.000												
17 Poor Time Estimates	.552**	.550**	1.000											
18 Poor Resource Estimates	.594**	.606**	.570**	1.000										
19 Poor Cost Estimates	.589**	.594**	.554**	.620**	1.000									
20 Poor Procurement Management	.612**	.652**	.502**	.569**	.577**	1.000								
21 Poor Contract Management	.694**	.636**	.503**	.601**	.624**	.649**	1.000							
22 Poor Scope Definition	.622**	.622**	.606**	.647**	.543**	.577**	.571**	1.000						
23 Ineffective Communication Plan	.605**	.623**	.543**	.591**	.572**	.547**	.574**	.581**	1.000					
24 Remote Work Environment	.485**	.523**	.407**	.532**	.516**	.531**	.531**	.517**	.441**	1.000				
25 Over runs in schedule development	.538**	.580**	.572**	.631**	.586**	.556**	.563**	.586**	.585**	.522**	1.000			
26 Testing Outcomes	.581**	.576**	.509**	.646**	.599**	.602**	.614**	.613**	.483**	.588**	.605**	1.000		
27 Poor change management	.661**	.670**	.551**	.651**	.601**	.632**	.630**	.646**	.620**	.565**	.620**	.630**	1.000	
28 Lack of Training	.651**	.633**	.554**	.538**	.559**	.597**	.630**	.571**	.529**	.555**	.551**	.586**	.583**	1.000
29 Multitasking Level	.257**	.283**	.365**	.266**	.210**	.250**	.189**	.301**	.292**	.141**	.293**	.246**	.317**	.227**
30 Multitasking Effectiveness	.173**	.176**	.222**	.151**	.131**	.134**	.120*	.158**	.213**	0.090	.187**	0.089	.172**	.178**
31 Adequate Buffer	.344**	.358**	.324**	.383**	.347**	.363**	.388**	.407**	.366**	.323**	.429**	.420**	.454**	.315**
32 Buffer Hours Allocated	.141**	.189**	.155**	.192**	.116*	.146**	.128**	.228**	.185**	.114*	.192**	.114*	.172**	.135**
33 Estimating Effectiveness	.197**	.193**	.179**	.132**	.140**	.127**	.136**	.220**	.176**	0.050	.143**	.176**	.134**	.177**
IPM														
34 Project Planning	0.078	0.065	.174**	0.037	0.015	0.078	0.053	0.075	0.058	-0.038	0.070	0.055	0.027	0.066
35 Risk Assessment	.101*	0.091	.169**	0.050	0.068	.157**	.102*	.107*	.110*	0.069	0.081	0.054	.096*	0.082
36 Ethical Sensitivity	.105*	.103*	.155**	0.057	0.034	.118*	0.090	.095*	0.080	0.005	0.074	0.065	0.070	0.078
37 Interprofessional Communication	.097*	0.094	.175**	0.054	0.038	.134**	0.086	0.094	.100*	-0.036	0.069	0.070	0.051	0.076
38 ***Overall IPM Score***	.102*	0.092	.185**	0.049	0.037	.125**	0.088	.104*	0.084	-0.017	0.075	0.066	0.055	0.082
EPO														
39 Bias for Action	0.031	0.019	.109*	-0.043	0.074	.130**	.105*	0.082	-0.017	.102*	0.021	.133**	0.013	.113*
40 Close to Customer	0.017	-0.004	.157**	0.009	0.045	0.071	0.040	0.038	0.018	0.055	-0.027	0.025	0.025	0.061
41 Innovation	0.035	0.074	.142**	0.075	0.069	.112*	.123*	.109*	0.044	.163**	0.071	.112*	0.050	.129**
42 Productivity through People	0.030	0.078	.122*	0.037	0.084	.096*	0.054	.097*	0.056	.136**	.101*	.104*	0.080	.106*
43 Loose Tight Properties	0.055	0.050	.150**	0.055	-0.002	0.086	.102*	0.081	0.019	.114*	0.062	.098*	0.067	0.064
44 ***Overall EPO Score***	0.037	0.048	.162**	0.033	0.069	.121*	.101*	.096*	0.020	.150**	0.051	.114*	0.056	.115*

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Table 8. Bivariate Correlations for the Project Implementation Characteristics, IPM and EPO

		General Project Data			Project multitasking		Project Estimating Accuracy			Interprofessional PM					Employee Perception of the Organisation					
	Variables	9	10	14	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
	Project Characteristics																			
9	Project Normal Duration	1.000																		
10	Project Overall Performance	.177**	1.000																	
14	Dominant Complexity Level	.116*	.103*	1.000																
29	Multitasking Level	-0.012	-0.058	0.044	1.000															
30	Multitasking Effectiveness	0.082	0.031	0.077	.350**	1.000														
31	Adequate Buffer	.111*	-0.045	0.020	.490**	.328**	1.000													
32	Buffer Hours Allocated	.173**	0.060	.115*	.101*	.293**	.170**	1.000												
33	Estimating Effectiveness	.119*	0.050	.148**	.258**	.483**	.275**	.288**	1.000											
	IPM																			
34	Project Planning	-0.021	-.113*	.105*	.394**	.259**	.245**	0.064	.238**	1.000										
35	Risk Assessment	0.001	-0.084	0.023	.325**	.213**	.251**	0.065	.191**	.743**	1.000									
36	Ethical Sensitivity	0.051	-.118*	0.057	.396**	.259**	.255**	.118*	.252**	.721**	.645**	1.000								
37	Interprofessional Communication	0.006	-.141**	0.049	.387**	.230**	.259**	.095*	.207**	.817**	.711**	.719**	1.000							
38	Overall IPM Score	0.011	-.134**	0.073	.423**	.259**	.280**	0.087	.241**	.933**	.829**	.845**	.927**	1.000						
	EPO																			
39	Bias for Action	0.064	-.160**	-0.017	.134**	0.037	.128**	0.035	0.066	.359**	.376**	.352**	.382**	.400**	1.000					
40	Close to Customer	0.000	-.183**	-0.044	.282**	.159**	.159**	0.052	.201**	.517**	.488**	.494**	.523**	.557**	.530**	1.000				
41	Innovation	0.024	-.193**	-0.029	.271**	.107*	.225**	0.037	.164**	.494**	.446**	.488**	.537**	.547**	.581**	.635**	1.000			
42	Productivity through People	0.020	-.206**	-0.054	.288**	.127**	.216**	0.020	.115*	.490**	.465**	.486**	.507**	.539**	.596**	.597**	.713**	1.000		
43	Loose Tight Properties	0.024	-.193**	-0.029	.233**	.108*	.151**	0.074	0.086	.480**	.445**	.467**	.519**	.531**	.486**	.510**	.578**	.566**	1.000	
44	Overall EPO Score	0.035	-.223**	-0.044	.290**	.117*	.219**	0.038	.155**	.554**	.526**	.548**	.588**	.618**	.758**	.786**	.888**	.856**	.732**	1.000

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Dominant Attributes of Project Implementation Characteristics, IPM, and EPO

Project Implementation Characteristics

The following is a summary of the findings on the dominant attributes of the project implementation characteristics:

- Normal project duration for most projects undertaken do not exceed 12 months.

- 39% of projects conducted by the respondents have medium complexity, whilst easy and complex projects amount to 33% and 28% respectively.

- 64% of respondents have a high to moderate multitasking effort in implementing projects.

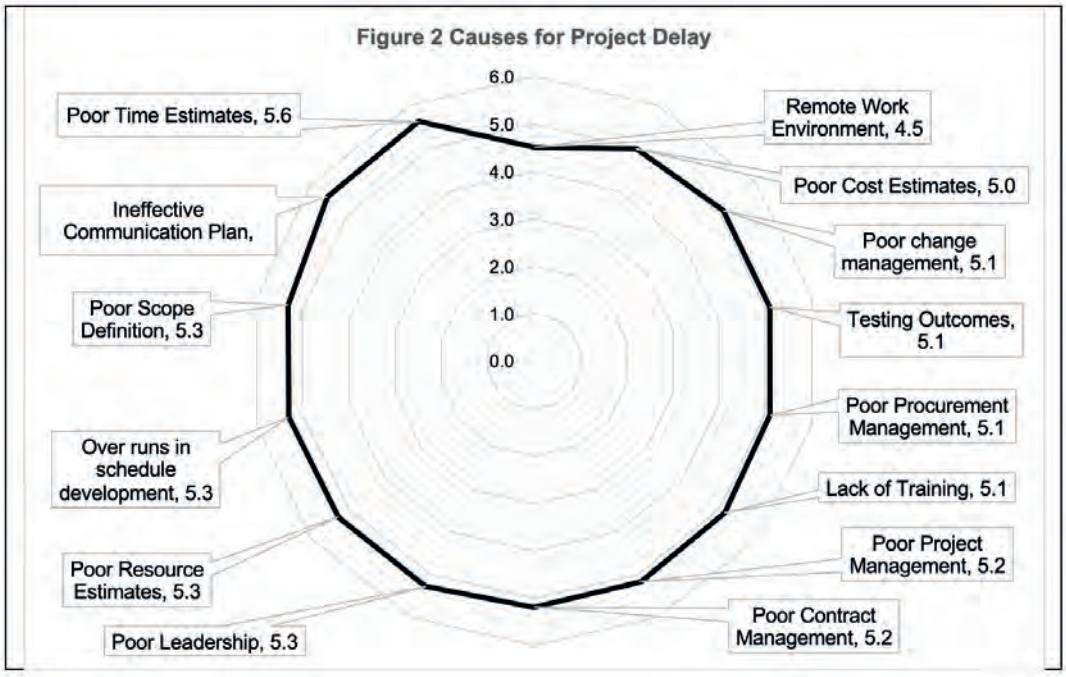
- 41% of respondents suggest that if they undertook a single project with no other tasks, their efficiency would increase by 30% to 50%.

- 60% of respondents have an extremely high to moderate accuracy in estimating tasks in preparing project schedules, with a vast majority inflating their estimates with buffer hours as an allowance for unscheduled activities in case something goes wrong during implementation.

- 52% of respondents will have 50% to 75% better project implementation effectiveness if they have no work or home related distractions.

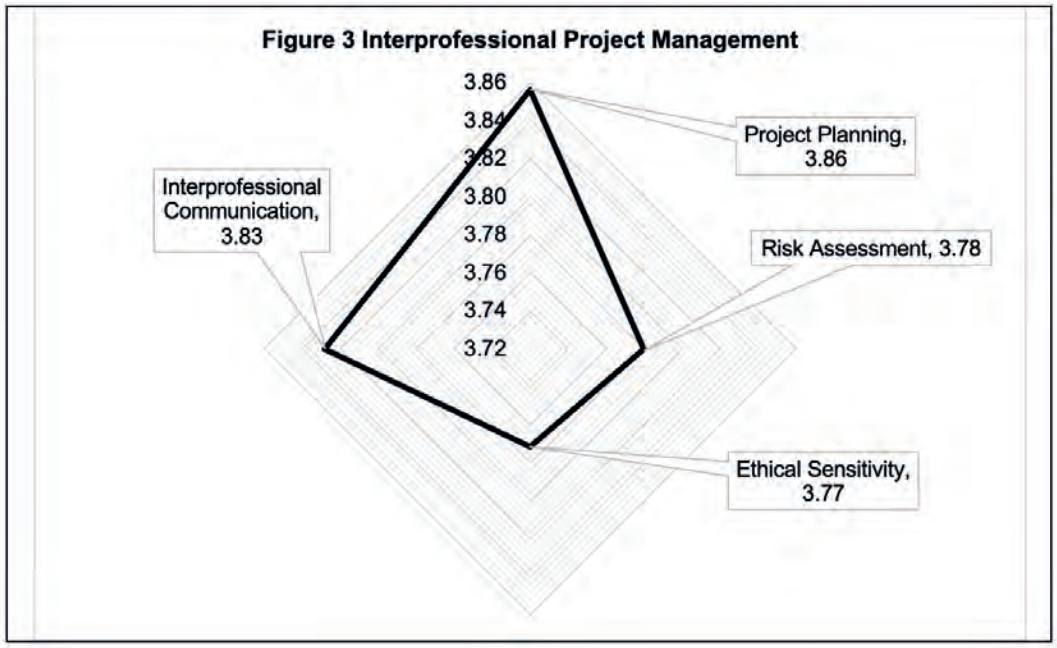
- 53% of respondents implement projects on time (40%) or ahead of schedule (13%).

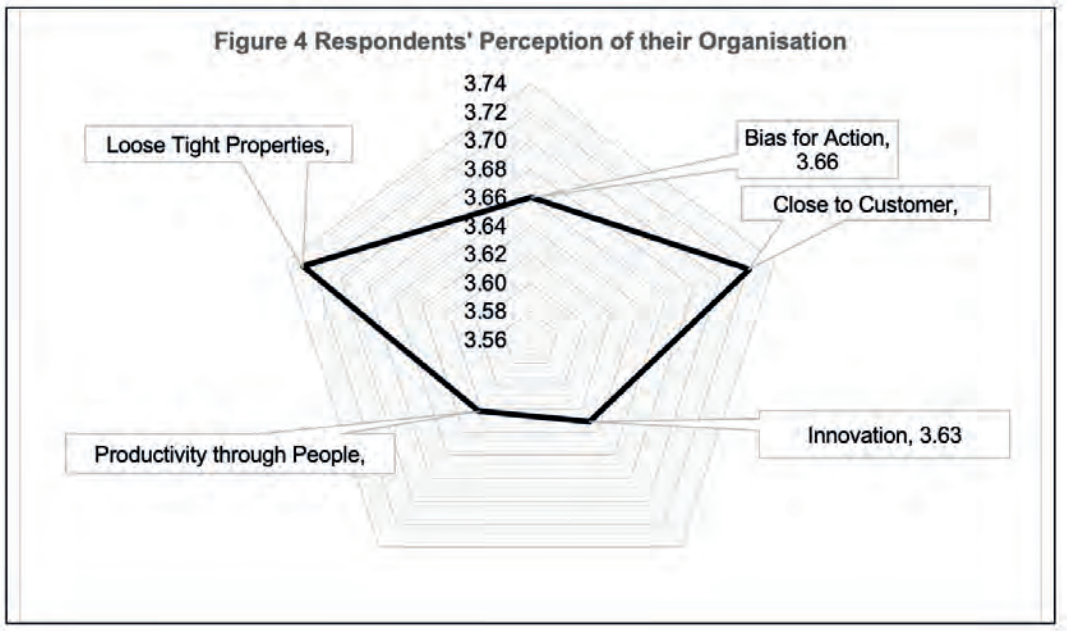
Figure 2 suggests that there are no dominant project delaying factors. With the exception of remote work environment, all causes appear to be approximately equal.



Interprofessional Project Management (IPM) and Employee Perception of the Organisation (EPO)

The findings at Figure 3 and 4 suggests that there are no dominate dimensions for both IPM and EPO. However, the score level of each dimension for both constructs are high, which is a significant positive indication that respondents enjoy a healthy professional attitude towards managing their projects and their perception of their work environment.





Relationship Between Project Implementation Characteristics, IPM, and EPO

The findings regarding this section are extracted from Tables 7 and 8. The findings suggest that the overall project performance (variable 10) has a low negative significant correlation with Interprofessional Project Management (IPM) and its dimensions (except for risk management), and also with Employee Perception of the Organisation (EPO) and its dimensions. The causes of project delay are coded from 0 to 10, increasing in intensity. Hence, this score must be seen from a reverse aspect. For instance, poor leadership is viewed as giving more importance to the leadership aspect. The findings show this aspect has a low positive significant relationship with IPM and its dimensions (except for project planning).

The time estimates aspect also has a low positive correlation with both IPM and EPO and their respective dimensions, indicating a positive impact. Moreover, the multitasking aspect has a significant moderate positive correlation with both IPM and EPO and their dimensions, suggesting that focusing on one project is more desirable. Therefore, the findings suggest that there are significant relationships between Project Implementation characteristics; IPM and EPO, and their associated dimensions.

Relationship Between Antecedents and Project Implementation Characteristics, IPM, and EPO

The findings of Table 6 show that many of the antecedents related to the cause of project delay have a significant low negative correlation with project role. Given that the coding is from 1 to 5 (senior to lower grade), the interpretation needs to be reversed. Hence, the more the senior role the higher the importance that is given to the specific cause of delay aspect. Furthermore, the antecedents regarding work experience, education level, have a significant low positive correlation with IPM and its dimensions, while employment type, and project role have a significant low negative correlation with IPM and its dimensions. However, the negative direction is mainly due to the nature of the coding used, and therefore need to be reversed. Moreover, the work experience and education antecedents have a low positive correlation with EPO and most of its dimension. Generally, the findings suggest that most of the antecedents do not impact the project implementation characteristics and IPM and EPO and their associated dimensions.

Discussion

The findings suggest that project duration, time buffering, and performance variables are important factors for this research study, since they outline the predicted timelines of projects, measuring whether projects are implemented on time. Looking at the timeline in isolation as a key success factor, the findings indicate that 40% of projects are delivered on time and 13% ahead of schedule. Assuming all other project benefit realisations have been delivered, such data is challenged when note is taken of the time buffers included in project timelines as a safeguard. Therefore, such projects may appear to have been efficiently implemented, but this success should be seen in the light of potential excessive time buffer allocations that were included in the project timeline.

In fact, the findings show that there is a significant positive correlation between project duration and buffer hours allocated. Hence, the use of time buffers does not enable a project to be completed on time but merely conceals the project implementation time inefficiency and the associated increase in monetary direct and indirect costs. Furthermore, the outcome of the additional project implementation time is that anticipated project benefits are delayed, which results in opportunity costs (or loss of project benefits) during the project delay period. This justifies the use of the CCPM methodology, because with all other things being equal, CCPM enhances project delivery time by eliminating multitasking and resource waste. The findings suggest that good project planning, risk management and ethical sensitivity, coupled with a positive facilitating work environment (EPO) from the perspectives of responsiveness, innovation, customer orientation, believing in employees and flexibility are likely to lead to the enhancement of the overall project performance.

The study itemised fourteen possible causes that may contribute to project delay. This study found that there were no dominant causes of project delay. All causes appeared to be of equal importance, except for remote working, which was of least concern. However, it is noted that poor time management and poor procurement management had an adverse impact on IPM and EPO.

The relationship between the causes of delay is important. For instance, the findings show a significant high positive correlation between poor leadership and poor project management. This supports the argument that leadership in project management is of critical importance. A suitable leadership position would be expected to uphold the project's vison, mission and values while embedding a team to move with autonomy, agility and confidence, and to ensure that the project has the right capacity and competencies to get the job done (KPMG, 2022b).

The findings also indicate a significant positive correlation between poor time estimates and multitasking levels. This supports the CCPM methodology, since the findings suggest that eliminating multitasking may cause respondents to be significantly more effective. For example, 73% of the respondents perceived their effectiveness to increase by 30% to 70% by mitigating multitasking. Hence, multitasking does not facilitate responsiveness within a project management framework and its inclusion may come at a substantial price. The findings show a positive correlation between poor scope definition and poor resource estimation in relation to adequate time buffers. The likely reason for this is that due to the inclusion of time buffers any adverse effects may cushioned. For example, poor project scoping is likely to lead to misunderstandings among team members, increasing the necessity for a greater change management effort leading to a higher risk of prolonging the original timeline of projects. Additionally, a lack of resourcing may encourage the inclusion of significant time buffers to the project timeline. Generally, the above illustrates that the causes of project delay are of almost equal importance and should all be adequately addressed for any real improvement in timelines and for the CCPM to be effective.

The IPM construct focuses on the importance of teams within the workplace that function to achieve a common goal. In other words, to attain the socio-cultural need to know and learn how to integrate and collaborate within a team. Its dimensions, which may be view as critical success factors examine project planning, risk management, ethical behaviours and team communication. Obtaining high scores for these four aspects means that an individual has the competences to positively participate in a project team and not act as an obstacle to solving issues and/or cause project delays. On the other hand, EPO measures the way individuals view their organisation in terms of its general attitude towards being responsive to resolving problems, being customer driven, innovative, believing in its employees, and flexible in the way it deals with its employees. In other words, obtaining a high score for EPO translates into having a working environment that promotes worthy features that are highly suitable for implementing projects. The findings show that the mean value scores for all the IPM and EPO dimensions are high and evenly distributed. This illustrates that project-oriented organisations as reflected by the broad background of the respondents have the appropriate attributes to facilitate the implementation of successful projects.

Additionally, there is a significant high positive correlation between all the dimensions of IPM and EPO. This supports the notion that having a suitable working environment as described previously positively nurtures interprofessional project management attributes leading to a higher skilled project-oriented workforce. Moreover, this finding supports the critical chain concept in that having a high score in IPM is likely to ease the pressure on having excessive time buffers. In support of this contention, the KPMG Project Management survey for 2022 lists communication (53%); team player (50%); resolving 'grey' areas (23%); leadership (22%); and motivating team members (18%) as the strongest skills required for project management. It should be observed that these factors are all integrated within the IPM and EPO concepts. Thus, supporting the argument that if these attributes are not addressed and managed effectively, they will likely contribute to project delays, irrespective of the methodology used. It should be noted that under the CCPM methodology, shortcomings and disparities in these characteristics will lead to further pressure on the having time buffers.

Conclusions

Fundamentally, project management is about coordinating various tasks and integrating them to attain the desired objectives (Kerzner, 2017) with the support of adequate leadership as being of utmost importance in managing projects (Madsen, 2019). This study addressed the following three research questions:

- What are the dominant attributes (dimensions) of project implementation characteristics, IPM, and EPO?

- What is the relationship between project implementation characteristics, IPM, and EPO and their associated dimensions?

- What is the relationship between the antecedents and project implementation characteristics, IPM, and EPO and their associated dimensions?

In addressing these research questions, this study has illustrated the following points:

- The importance of having resource capacity and competency for executing projects.

- There are no dominant causes for project delay. They are all equally critical.

- Excessive use of multitasking is likely to come at a high cost to organisations.

- Delivery timelines are heavily influenced and dependent on liberal time buffers.

- IPM and EPO are important factors that promote good project management as they entrench a culture of project discipline.

Every organisation is unique in the sense that it follows the values and culture of the particular organisation, coupled with its standards that set the ways of doing things in its daily working practices. Based on the literature and the findings from our research study, it would be beneficial for management to:

- Clearly evaluate the true cost of multitasking and time buffering both in monetary and non-monetary terms.

- Learn, understand and appreciate the benefits of the Critical Chain Project Management.

- Ensure true Leaders are empowered and rewarded for the smooth execution of projects that deliver the original set targets.

- Entrench a working practice that mitigates multitasking and excessive time buffering within the project management framework and ensuring that projects are adequately resourced.

- Develop proficient and responsive project teams that embrace teamwork and strive to solve issues collectively.

- Ensure that employees are listened to, and any concerns they may have, are swiftly addressed. This is likely to enhance favourably their overall perception of their organisation, which will encourage commitment and improves the work environment.

The above points effectively address the critical success factors of projects and ensure a smooth transition to the application of the Critical Chain Project Management.

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07 A Review of the Knowledge Management System at the Quality Department in a Maltese Hospital

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Abstract

Objectives: Knowledge management (KM) is the art of transforming information and intellectual capital into sustained value for a healthcare organisation's clients and its workforce. KM can provide solutions to overcome challenges such as increasing health care costs and increasing demands for improving quality of care. This study aimed to review the knowledge management system used by the Quality Department in a local hospital.

Methods: A qualitative systems review of the quality department's documentation, technology, and processes was conducted. Findings were used to inform semi-structured questionnaires with the quality department staff, as well as a focus group session with end-user representatives of the knowledge management system.

Results: The study highlights the critical elements necessary for hospital QI through the lens of people, processes, and technological integration necessary for effective knowledge management. These include the importance of seamless integration between disparate systems, the need for leadership and governance, user training and support, and the value of continuous monitoring and feedback mechanisms to ensure the system's efficacy.

Conclusions: The study concludes with recommendations for tailored interventions for the hospital to address the existing KM challenges to improve efficiencies, improve patient outcomes, and develop a more resilient and adaptive healthcare system.

Keywords: "Knowledge Management"; "Knowledge Management System"; "Healthcare Quality Improvement (QI)"; "Community of Practice (CoP)"; "Organisational Knowledge Culture".

Graphical Abstract

Highlights:

- Effective use of Knowledge Management in healthcare improves professionals' knowledge and mitigates the challenges of information overload, patient safety, and operational efficiency.
- An optimal Knowledge Management System in a hospital requires careful consideration of user experience, integration strategies, and the evolving technological landscape, as well as organisation-wide commitment to embrace continuous learning and innovation.
- The insights gained from this study underscore the necessity for the hospital to address existing challenges in knowledge management within a hybrid environment of paper-based and digital records so that it can improve efficiencies, improve patient outcomes, and develop a more resilient and adaptive healthcare system.
- A systemic approach integrating people, technology, and processes has been recommended as a way forward to successfully foster a culture of continuous improvement and evidence-based practice.

Introduction

Knowledge management (KM) is the art of transforming information and intellectual capital into sustained value for a healthcare organisation's clients and its workforce. When applied effectively, KM can provide solutions to overcome challenges such as increasing healthcare costs and increasing demands for improving quality of care (Guptill 2005; Nicolini et al. 2022).

Inadequate use of healthcare knowledge may lead to making wrong clinical decisions, medical errors, lower utilisation of resources, and an increase in health care costs (John Orzano et al. 2008). Healthcare organisations have rich information resources, therefore applying KM processes can help them provide better and more cost-effective services (Salehi et al. 2015). The use of KM in healthcare can lead to improving patient safety, supporting care processes, reducing health care costs, and improving the quality of care (Ovretveit 2009).

However, one in ten hospital patients suffer an adverse event, and a significant number are harmed and need extra treatment (Perneger 2005). Common adverse events include adverse drug reactions, surgical complications, infections, falls, and pressure sores. Poor quality healthcare may not always result in an adverse event, but can involve ineffective use of treatments or tests, failure in coordination and communication between providers, and poor patient experiences of care. All are, by definition, avoidable, and have significant harm and cost implications. In contrast, Quality Improvement (QI) in healthcare has been defined as 'better patient experience and outcomes, achieved through changing provider behaviour and organisation, using systematic change methods and strategies' (Ovretveit, 2009).

Thus, the effective use of KM in healthcare seems to be an effective solution to improve professionals' knowledge and mitigate the challenges of information overload, patient safety, and operational efficiency (Tsai and Hung, 2016).

The Hospital under review in this study has, over the past 10 years, been undergoing a significant transformation, thanks to a quality journey embraced by leaders and staff alike. This process has seen the introduction of quality key performance indicators and a gradual improvement in patient safety, staff engagement, and customer satisfaction metrics. The organisational culture is slowly shifting to one that embraces organisational learning, but echoes of a punitive culture remain.

The main objective of this study was to analyse the status of the Knowledge Management System (KMS) at the Hospital's Quality Department (QD). This included a review of the structure, people and technology, aiming to apply the KMS model that best fits the QD. The mapping of processes and responsibilities, and the analysis of cultural and environmental factors in the Hospital under review were also carried out.

Methodology

Study Design

This research consists of a qualitative cross-sectional review of the KMS at the Hospital's QD, conducted in a phased approach. A system analysis was conducted first, that is, a systematic procedure that aims to review and evaluate QD documents, processes, and procedures on KMS. This method involved a detailed review of documents and processes to extract themes or patterns that are relevant to the KMS, which was then used to structure the interviews and the focus group session. Following this review, QD staff and Hospital end-user representatives were approached through interviews and a focus group session respectively, based on the findings from the initial assessment.

Combining document/system review with QD staff interviews and feedback from user-representatives enabled data to be triangulated, enhancing validity and reliability of findings. This qualitative approach provided a more holistic understanding of the KMS within the QD, enabling the identification of areas for improvement and recommendations that are informed by both documentary evidence and stakeholder perspectives.

The Sample

Purposive sampling was adopted. This is a strategic method of selecting participants for gathering information-rich data (Patton 2005). For the face-to-face interviews, all four (4) QD staff were included. Given their +5 years of experience in their respective field of specialty, they were considered to be the most suited to provide in-depth information regarding the KMS at the QD. Further participant details were not included as individuals could be easily identified given the research context.

Analysis from the in-depth interviews was then used to inform the focus group session. The sample included all the 14 members of two hospital committees: the Quality Board (QB) and the Care Environment Committee (CEC). These two committees were selected as they include all the executive and frontline hospital leaders with experience in interacting with the QD's KMS. This helped to ensure a broad representation of professions across hospital departments, including clinical and non-clinical fields such as medical, nursing, pharmacy, allied health, quality management, laboratory, human resources, finance and administration, facility management, engineering, and materials management. Out of the 14 professionals invited, 12 consented to participate. No further details could be provided to ensure anonymity given the research context.

Research Procedure

The research procedure involved a sequential methodology. In the first phase, a document review was carried out at the QD, analysing paper and digital data repositories including procedures, guidelines, meeting minutes, governance documents, performance metrics, and safety reports. Findings from this review informed the in-depth interviews with QD staff members (second phase). The interviews started with general questions followed by exploratory interrogations, in order to obtain richer nuances. Each interview session lasted between 45 to 60 minutes. Audio-recording was used during the interviews. The interviewer also sought permission from each participant to email the interview transcript back to them. This allowed the participants to review and amend their responses.

In the third phase, KMS end-user representatives were invited to take part in a focus group session at the hospital. An invitation email was sent out two weeks in advance providing details about the study and asking for informed consent a priori to the focus group session. 12 out of 14 participants confirmed their participation and informed consent ahead of the session. The discussion guide for the focus group session was based on the findings from the first two phases of the research. The focus group session lasted 120 minutes. Audio-recording was used during the focus group session and the transcript was mailed back to participants for review and amendments.

All research was conducted by the same person ensuring a higher degree of consistency. Figure 1 describes the research process and its phases.

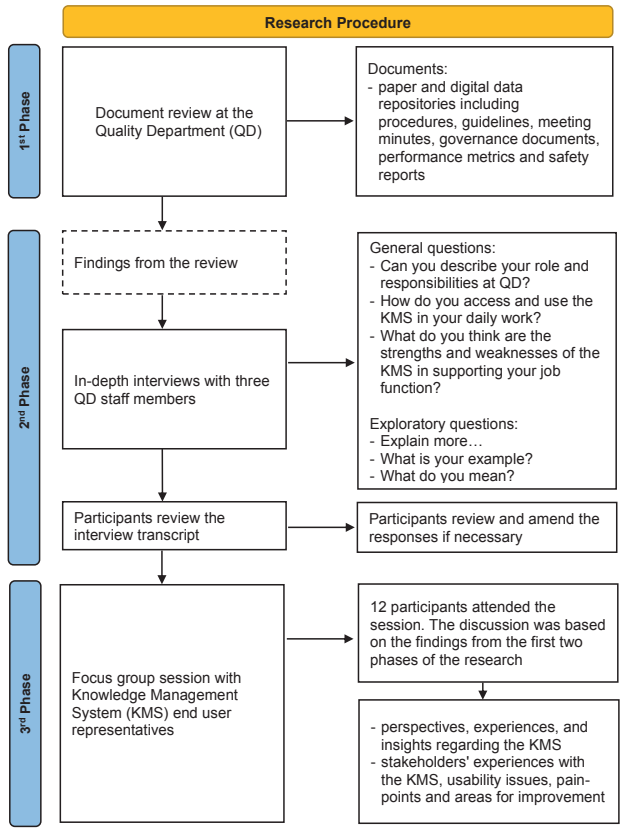

Figure 1. Research process and phases. Flow diagram adapted from the PRISMA model (Page et al., 2021).

Data Analysis

The document review involved systematically identifying, selecting, and analysing relevant QD documents according to the research objectives and scope. Documents were screened to ensure relevance, and thematic analysis was used for organisation and interpretation. Findings were synthesized, reported, and used to inform the interview questions.

All interviews were transcribed verbatim and emailed to participants for member-checking prior to the data analysis. None of the participants returned the transcript for editing; all agreed with the content of the transcripts.

Data analysis was conducted through inductive thematic analysis, which according to Clarke, Braun and Hayfield (2015), is driven by the data rather than by pre-existing conceptions. Throughout the data analysis process, the transcripts were repeatedly checked individually and against other transcripts to ensure a thorough thematic analysis, based on the widely used six-step approach to coding and development (Braun & Clarke, 2006).

Upon confirming the interview transcripts, which were used as source data for the study, the thematic analysis technique was used to methodically identify, arrange, and understand patterns of themes within the data set. First, the researcher read each transcript multiple times to familiarize herself with the data and identify common ideas. The researcher then highlighted meaningful and significant terms, ideas, and quotes in the data and re-worded them into concise codes individually. Coding was done manually as time was limited and codes were then used to generate themes. A 'theme' captures an essential aspect of the data in relation to the research question. The emerging themes were reviewed in light of the coded data to assess for correlation and their pertinence to the research question. Themes were then described and identified by their uniqueness and their relevance to the research question. The last stage was to analyse and report the findings.

Findings from the focus group session were analysed in a similar manner to ensure data saturation and that no new themes emerged. Although it would have been ideal to employ an independent researcher, this was not possible owing to time constraints.

Ethical Considerations

This study was approved by the IDEA College Ethics Board and the Data Protection office of the hospital where the research was conducted. All participants were provided with an invitation letter and an explanation of the research objectives. Written informed consent was obtained a priori. All interviews and the focus group session were conducted in a quiet room at the hospital for confidentiality purposes. Member-checking allowed participants to review and amend their responses. The interviews and the focus group session were conducted by the same researcher. All participants were assured that information collected during this study would be treated with strict confidentiality. To ensure anonymity, personal information was kept separate from the research data, and any identifying details were removed in the reporting of the findings. Only the researcher involved in the study had access to the data, and all data was securely stored and protected. There were no environmental concerns.

An important note is that participants could provide socially desirable responses or hold back information due to the sensitive nature of the study and new team dynamics within the current leadership team. This was mitigated by seeking consent a priori, member checking where appropriate, and reassuring participants of confidentiality and anonymity, as well as reminding them of their right to withdraw from the study at any point.

Results

The systems review and the interviews with the QD staff provided detailed perspectives on the current KMS status at the hospital and its role in KM and QI. All four provided helpful insights into what the current challenges are and how these can be addressed to improve KM, with common themes including the need for a comprehensive EHR and an integrated user-friendly KM platform, the role of leadership and culture, as well as organisational dynamics in sustaining and encouraging a KM culture, providing a safe knowledge-sharing environment based on trust and mutual respect, the need for access to education, training opportunities and continuous learning, and the importance of integrating KM into decision-making. While some themes overlap, each interviewee brought unique insights and suggestions, emphasizing the multifaceted nature of KM within a hospital organisation.

These concepts are largely reflected in the findings from the focus group session with KMS end-users. A greater emphasis was made on the challenges faced by patient-facing users, and two new themes emerged from the focus group, namely time pressures and a silo mentality. Otherwise, themes reflected those which had emerged in the interviews, including a culture of fear, the importance of leadership-driven KM, the lack of appropriate ICT tools to capture knowledge creation and enable knowledge transfer, the need for structured training and development, and the need to integrate QI KM in everyday decision making in a multidisciplinary context.

The current KMS status at the QD will be described in terms of document and systems review, people, processes, and technology.

System Review

The KMS at the QD at the hospital was mapped out and categorised during the initial systems review and is summarised in the table 1.

Category	Description	Source
1. Clinical Guidelines and Protocols	Standard Operating Procedures, Best Practices, Evidence-Based Guidelines, Treatment Protocols	QD NHS Portal, NHS Circulars, Digital Repositories, UpToDate, MedicinesComplete
2. Research and Evidence-Based Information	Clinical Research Articles. Evidence summaries from internal reports, investigations, systematic reviews, peer reviews and root cause analyses	QD Journals and Publications
3. Patient Care Information	Patient files (paper), electronic records, care plans, discharge summaries	Medical Records Department, CPAS, RIS, PACS, LIS, iSOFT Clinical Manager, NHS Patient Portal
4. Educational Material	Training Modules for Staff (courses, tutorials and training materials for staff development), Patient Education Resources and Information Materials	HR Department QD
5. Operational Information	Administrative and operational policies and procedures, Performance Metrics, Customer Satisfaction Surveys, Incident Reports	QD
6. Collaboration and Communication Tools	Communities of Practice, Hospital Committees, MDT Meetings, Committee Charters, Meeting Minutes	QD
7. Regulatory and Compliance Information	Licensing Guidelines and Inspection Reports, Regulatory Guidelines (e.g. GDPR, Radiation Protection, JCI, IPSG), Audit Reports	QD
8. Quality Improvement Tools	Project Documentation, Lessons Learned, Peer reviews, RCAs	QD
9. IT and System Documentation	System Manuals, Technical Support	QD IT Department

Table 1. Mapping of documentation at QD KMS

The following depicts the interactions between people, processes, and technology involved in the QD at the hospital under review (Figure 2). Mutual interactions occur between people and processes domains, but there is a distance between these two domains and the technology domain, based on the limited number of interactions observed. The knowledge application process appears to be the only item that is directly connected to all three domains analysed: people, technology, and the process itself.

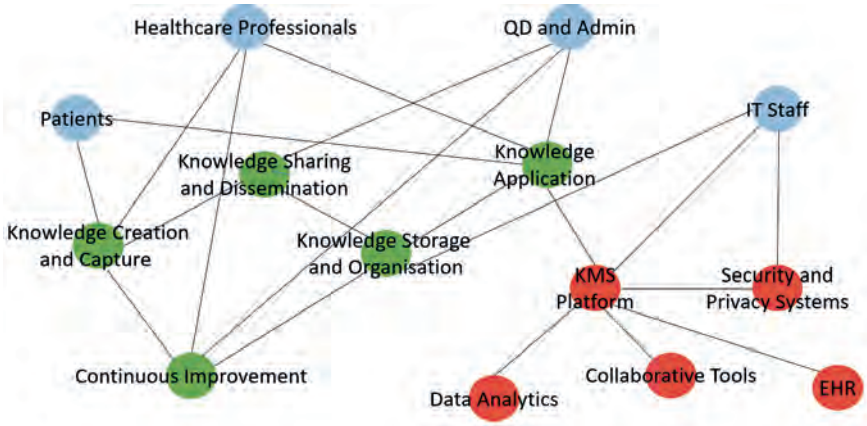

Figure 2. Interactions between people, processes, and technology in the QD KMS. The blue circles represent people, the green represent processes, and the red technology.

People

The people involved in this research study included the QD staff and a multidisciplinary representation of hospital professionals, including doctors, nurses, allied health professionals, HR, finance and administration, facility and materials management, operations, pharmacy, and IT. Patients are also end-users of the KMS in various ways, but no patients were involved in this study for confidentiality purposes. The patient perspective was however explored during both the interviews and the focus group session.

Quality Department

The QD team at the Hospital is composed of a four-person team that drives and organises the QI efforts for the entire hospital. A specialist nurse was recruited to assist the team a few years ago, but the nurse left the hospital, and the position was not readvertised "despite repeated requests to management". The QD team manages the QD KMS, including the collection of operational data, analysis, regulatory compliance, and performance metrics according to established key performance indicators (KPIs). This team also facilitates communication and collaboration across departments, and liaison with the HR department for training and the Information Technology (IT) department for system support.

KMS End-Users

KMS end-users in this hospital include clinical and non-clinical professionals. Clinical professionals engage with the KMS to access clinical guidelines, patient care information, and educational material. They contribute by updating patient records, reporting incidents, and participating in communities of practice. Non-clinical staff are involved in regulatory and performance metrics, health and safety regulations, safety of biomedical equipment, licensing and environment of care concerns.

IT Department

The IT team is supportive but limited in their ability to change processes which are National Health System (NHS)-driven. They do their best to ensure that the technological aspects of the KMS are maintained and secure and, where possible, integrated with other hospital systems. They provide technical support and manage system security and access control.

Patients

Patients interact with the QD KMS through patient care plans and educational materials provided by healthcare professionals. Their feedback is incorporated into quality improvement processes including. incident reviews and patient satisfaction surveys.

QI Governance structure

The QD Head is part of the senior leadership team and answers directly to the hospital Chief Executive Officer (CEO). The QD Head also chairs the Quality Board, a multidisciplinary team that was designed to meet once a month to discuss and review quality and patient safety issues. The governance structure of the hospital is such that it was designed to follow Joint Commission International (JCI) Guidelines on Quality and Patient Safety in having a series of multidisciplinary committees reporting to the senior leadership team. These are depicted in the organigram below (Figure 3) and were intended to ensure that quality and patient safety were embedded in all aspects of hospital management, including clinical and non-clinical care.

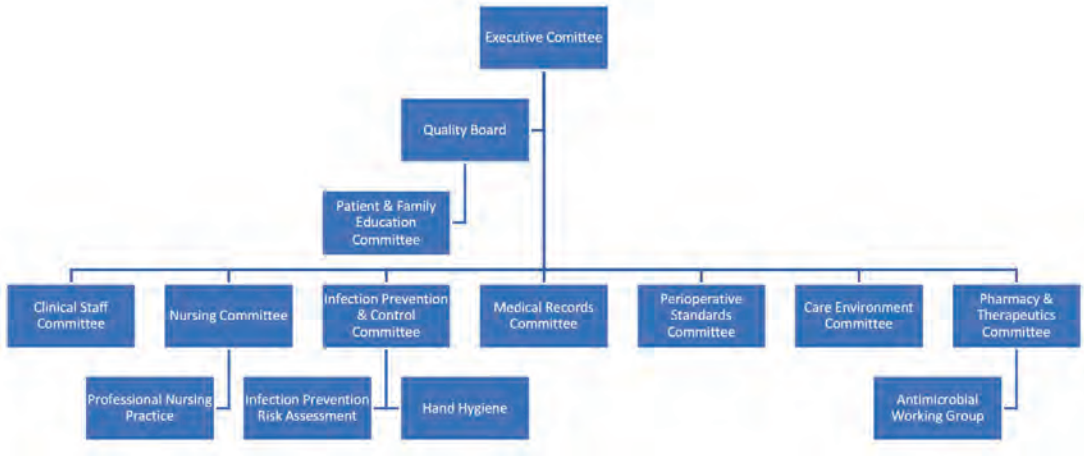

Figure 3. The QI Committee Structure at the Hospital

The composition of these multidisciplinary committees is in fact representative of all KMS end-users including clinical and non-clinical professionals, such as doctors, nurses, allied health professionals, pharmacy and procurement, human resources (HR), finance and administrative, as well as patient representatives on the Patient and Family Education Committee. All the Chairs of the respective Committees are also members of the Executive Committee or of the hospital leadership team to ensure top-down, bottom-up, and inter-disciplinary information flows and that Quality and Patient Safety (QPS) practices are aligned.

The hospital has undergone several changes in the hospital leadership team in a relatively short period of time, and both in the interviews and the focus group session, participants expressed disappointment and concern that very few of the Committees, including the Executive Committee, are meeting regularly or functioning properly.

Focus Group Participant X stated, "we had come a long way, but we seem to be working in silos again," and QD staff said, "we only meet if there is a complaint or an incident, and the focus is rarely on how to learn from it or prevent it from happening again, but on deflecting blame or sweeping things under the carpet."

Processes

Four domains were used to address the results on the processes: Knowledge Creation & Capture, Knowledge Storage & Organisation, Knowledge Sharing & Dissemination, and Knowledge Application & QI. In each domain, four aspects were addressed: clinical information, best practice, evidence-based medicine (EBM); guidelines and Standard Operating Procedures (SOPs); quality improvement efforts; and education, training, and development.

Knowledge Creation & Capture

Both clinical and administrative staff are responsible for patient records, including the input of clinical data, treatment plans, outcomes, and follow-up data. Participants from both interviews and focus groups complained about the fact that the hospital still has not fully digitalised the patient records, relying on a combination of paper files and various non-integrated digital solutions for data input and capture.

With regards to best practice, EBM, and guidelines, most of the clinical staff rely on a portal provided by another hospital and on circulars usually developed and steered by the NHS.

The internet is also a good source, with focus group participants stating that they make use of freely available information from reputable sources to develop and adapt new clinical guidelines and protocols based on the latest research and clinical evidence. This practice was reflected in the interview findings with all QD staff saying that SOPs for various medical and administrative processes are created in a similar manner.

Quality Improvement efforts assessment showed that the QD staff coordinate the documenting of incidents, errors, and near-misses, as well as specific audits and QI projects. Patient data is analysed by QD staff to monitor patient outcomes and identify trends, successes, and areas needing improvement. The QD team also extracts data on processes such as wait times, treatment durations, and patient satisfaction scores to provide reports with process metrics and key performance indicators to hospital management. Data extraction from the current patient administration system (PAS) is not straightforward as the system is not owned by the hospital and the staff describe the process as "time-consuming" and "cumbersome."

The QD team liaises with the HR department to develop training and materials for staff to ensure they are up to date with the latest practices and technologies. There is no formal training programme in place yet, but mandatory training is now being documented and recorded. No workshops or seminars are organised by the hospital, but management generally supports individuals who request time off for such purposes on their own initiative. There are no programmes in place for staff feedback or suggestions. The QD also coordinates the Patient Education process, compiling and providing materials to be disseminated to patients with respect to specific diseases, interventions, or preventative care.

Knowledge Storage & Organisation
Due to the hybrid system of paper and digital records, both the QD and KMS users responded that organising and storing knowledge effectively is a significant challenge. The digitisation of NHS paper patient records has long been promised but not yet implemented, and the array of digital solutions provided for aspects of the patient record, such as laboratory and imaging, are not fully integrated. Some improvement has been seen since the provision of an NHS tool called the Patient Portal, but again this is not comprehensive and not fully integrated with other systems. There are plans to implement a fully electronic national health record by 2025.

Knowledge Sharing and Dissemination
Clinical staff are provided with access to digital repositories such as UpToDate (clinical guidelines, EBM) and Medicines Complete (Pharmaceuticals). New guidelines or SOPs specific to the hospital are stored in paper and digital format by the QD and the respective department leads.

These are stored and organised at the QD in a mix of paper and electronic formats. There is no apparent categorisation or taxonomy, but shelves upon shelves of box files in a locked cupboard and the QD staff's personal computers, with hospital staff having to go in person to the QD offices and ask for any documents needed.

The QD fully relies on the HR department for storage of training and development information. The QD staff fed back that these are stored in the individual employee record and not on an organisational level, making reporting of training activity laborious and time consuming. There is no repository of shared training material. Patient education material is stored in soft and hard versions at the QD. Clinical staff discuss patient information through ward rounds, multidisciplinary team meetings, and Continuing Professional Development (CPD) activities involving case conferences. Internal communication through phone calls, consultations, and email is also significantly availed of. Clinical staff communicate information with patients directly, and also through reports and discharge summaries.

Guidelines and SOPs are shared in both paper and electronic formats, and in the absence of formal committee meetings, collaborative tools such as WhatsApp, SharePoint, and Microsoft Teams groups have emerged that are also serving as virtual communities of practice where information can be communicated and shared in real time. However, there are GDPR and security concerns using these collaborative tools to exchange patient information. Important clinical guidelines are found in a folder in each ward or clinical area, and several notice boards are used to display fundamental safety techniques such as handwashing, infection control, and cardiopulmonary resuscitation (CPR).

The QD staff expressed concern that in the absence of monthly QI committee meetings, where new knowledge and best practice would normally be shared, only staff involved in QI initiatives or incidents come to the office asking for information. Incidents and investigations are managed through peer reviews and root cause analyses, allowing for involved participants to share knowledge amongst themselves. Whether this gets disseminated to a wider audience is debatable and very much individually driven. KPIs and performance reports are produced by the QD every quarter and submitted to the hospital CEO for review, but no feedback or benchmarking procedures are in place anymore.

Training materials are shared before or during training events, but since there is no digital platform or online repository, it is not possible to share or disseminate efficiently once the training event is completed. A group of medical doctors have taken the initiative to set up arrangements with other local hospitals and with various UK Colleges to link up online for educational and peer review purposes, discussing patient care and QI concerns in these virtual communities of practice. Some of the focus group participants reflected that the hospital in the past used to organise quality and safety days, dedicated to specific concerns, improvements or even achievements, and said that these were instrumental in nurturing awareness amongst a wider audience. Patient education material is distributed to patients by the respective clinical departments.

Knowledge Application & QI

The hybrid state of patient information and the lack of access to integrated decision support tools make it more difficult to incorporate the latest knowledge and best practice into patient care. New knowledge is embedded into daily workflows through NHS circulars, online guidelines or individually driven initiatives to update protocols, checklists, and reminders. For example, new safety procedures are integrated during ward rounds, multi-disciplinary team (MDT) meetings, or into shift handover routines. The staff involved in the research study were not aware of whether any audit of either paper or digital records is carried out to ensure they are up-to-date and complete.

Despite several communities of practice that have emerged following the "disruption" of the prior QI committee structure, it is evident that monitoring of performance and gathering feedback to identify any areas or issues for improvement is no longer being carried out in a structured manner, but rather on an ad hoc basis depending on the issue, such as an incident, or on individual motivation. The follow-up of incidents or near misses is being carried out appropriately, but the Plan-Do-Study-Act (PDSA) cycle embedded within the former committees has been discontinued. The QD staff also expressed disappointment that despite their continued efforts to collate and submit KPI and performance reports to management, these were not being evaluated and no feedback was being passed back to either the QD or to hospital staff. In effect, the lack of feedback loops seems pervasive throughout as meetings seem to be discouraged.

Technology

The technology was evaluated across five domains: KMS platform, EHR, collaborative tools, data analytics, and security and privacy systems. With regards to the KMS platform, the QD Office is, to a large extent, serving as the central hub for capturing, storing, organizing, and disseminating knowledge within the hospital. However, the governance or committee structure that was designed to assist the QD in this effort of collaboration, decision-making, and continuous QI is not functioning, meaning there is no structured environment for managing both tacit and explicit knowledge.

As already described for the Electronic Health Record (EHR), there is a hybrid system of paper files and digital solutions in place, creating security and access concerns. Efforts are made by IT and hospital staff to manage patient data efficiently, to support clinical decision-making and enhance the quality of care. Because of the lack of full integration with other systems, it is difficult to maintain comprehensive and up-to-date patient records.

Several collaborative tools such as Microsoft Teams, SharePoint, and WhatsApp have emerged over the last few years to enable real-time communication and information sharing among hospital professionals. These tools support teamwork and coordination by providing platforms for discussions, file sharing, and virtual meetings. They also play a crucial role in fostering a collaborative culture and ensuring that knowledge is effectively disseminated across the hospital.

Data analytics is not automated but is manually coordinated by the QD staff, who need to process and analyse large volumes of data generated within the hospital and evaluate it to identify trends, measure performance, and uncover insights that drive quality improvement initiatives. The lack of automated tools limits the transformation of raw data into actionable intelligence to support decision-making and implementation of evidence-based practices.

Security and privacy systems are implemented by the IT team to safeguard sensitive patient information and ensure compliance with GDPR regulatory requirements. Encryption, access controls, and monitoring mechanisms protect data from unauthorized access and breaches. They are essential for maintaining patient trust and ensuring the integrity of the hospital's information systems. The hospital under review was involved in a data breach investigation some years ago, so there is heightened awareness of the importance of GDPR. Some limitations remain because of the paper patient records which need to move across institutions according to patient need. There are no digital or structured systems for document management or learning management.

Discussion

It is clear from the findings that the KMS challenges faced by the QD and KMS end-users in the hospital under review reflect those found in the literature (Anderson et al., 2019). All participants emphasise the importance of nurturing a culture for KM and QI and relate the deterioration of this culture to the many changes in leadership and a lack of corporate vision, awareness, or commitment to KM and QI. The lack of centralised KM and QI strategy, the lack of planning, the reliance on the NHS for change, and the disinterest in sustaining and supporting the former QI committee structure is of concern to all participants as there is a "disconnect" and the hospital "seems to have lost the common guiding philosophy on QI." Evidence shows that leaders are critical in nurturing a collaborative culture and knowledge sharing to improve team performance (Karamitri, Talias and Bellali 2017; Nauman et al. 2021). Leaders also drive motivation and buy-in to encourage and sustain adoption and use of KMS by healthcare professionals in their efforts to improve performance and the quality of healthcare provided (Damodaran and Olphert 2000; Chang and Lin 2015; Karamitri, Talias and Bellali 2017; Kosklin, Lammintakanen and Kivinen 2023).

Leadership is a critical element for knowledge creation, acquisition, utilisation, and integration processes (Pellegrini et al. 2020). Lack of support is also affecting the QD team, which is overworked and understaffed, and very concerned about its own sustainability. Literature shows that active support and involvement from organisational leaders is crucial for championing KMS, as well as securing the necessary resources including people and budget (Song, Park and Kang 2015; Intezari, Taskin and Pauleen 2017). While HR and IT departmental support are available, they are both limited in the support they can offer, as most tools are centrally driven by the NHS. Hospital leadership is also lacking in failing to review performance metrics, KPIs or KMS effectiveness, thus missing out on closing the QI loop and the opportunity to encourage and adopt feedback from end-users for ongoing improvement (Jørgensen et al. 2019; Matsuo and Aihara 2022).

Another challenge is the lack of an integrated knowledge architecture to enable health professionals to transform unconnected data into usable/reusable knowledge (Phan, Phan and Trieu 2022). The lack of a document management system means there is no systematic identification and organisation of scattered tacit and explicit knowledge, missing the opportunity to make it accessible for reuse through knowledge repositories and SOPs (Baptista et al. 2019). ICT is a moderator of knowledge creation and knowledge sharing in improving quality of healthcare services (Colnar et al. 2022). A lack of integration between the different IT-based systems in the hospital, paper records, and the lack of decision support systems is a concern echoed by all participants, as it results in non-integrated silos of information that do not enable QI efforts to exploit the full KM potential (Damodaran and Olphert 2000). The current KMS infrastructure is thus neither intuitive nor user-friendly and does not integrate seamlessly with existing business processes and day-to-day workflows to facilitate knowledge transfer. Hospital professionals cited time and stress pressures – literature shows that a non-usable, non-human centric design is detrimental to KM and QI, efforts (Hojabri, Eftekhar and Sharifi 2014; Cruz and Ferreira 2016; Candra and Putrama 2018; Colnar et al. 2022).

This is also reflected in the feedback provided by the QD staff, who find it difficult to extract data from the Patient Administration System and who sometimes have to resort to trawling through paper records and illegible handwriting.

The need for a learning management system or structured training programmes was also made evident in the interviews and the focus group. Evidence shows that a knowledge-sharing culture within an organisation arises when knowledge sharing and continuous learning are considered as fundamental resources for creating value in the organisation (Jørgensen et al. 2019; Matsuo and Aihara 2022). Research also shows that KM systems cannot be exploited to any real extent unless there is learning and understanding of the potential that they offer (Damodaran and Olphert 2000). Respondents cited the need for comprehensive training, communication, and ongoing support as critical in facilitating ongoing KM and QI. For the focus group participants, this meant education at both group and individual levels on the benefits of sharing knowledge, and they cited the need for a hospital intranet where training material, lessons learned, incident and system reviews, and other QI information could be made available and accessible as and when required. The QD staff state a need for specific content training in how to manage documents, how to structure available information, and how to access control criteria (Damodaran and Olphert 2000; Hojabri, Eftekhar and Sharifi 2014). Research shows that an environment that values and rewards contributions encourages active participation and engagement. Respondents in fact recollected previous quality days and related safety events, stating the need for incentive systems to recognize valuable contributions, such as peer recognition, celebrating successes, and professional development opportunities.

KMS implementation is more successful when communication tools are provided that facilitate collaboration, such as discussion forums, wikis, and chat functions (Jørgensen et al. 2019; Matsuo and Aihara 2022). In the absence of a hospital intranet, several informal collaborative tools are being utilised for QI such as WhatsApp, Teams, and SharePoint, which are not formally endorsed and do not have built-in security or access control rigour. Since hospitals deal with sensitive patient information with legal, regulatory, and ethical requirements for confidentiality and data protection, access control policies are required to ensure secure and appropriate access to knowledge within the KMS (Nyame and Qin 2020). Both QD and focus group respondents expressed concern about the possibility of patient information being seen by unauthorized individuals or groups. This can also undermine trust and openness and limit the ability of the hospital to embrace an open learning culture.

The study faced several limitations that need to be acknowledged. This study assumes that participants provided accurate and honest responses during interviews and the focus group session, and that the selected sample of participants adequately represents the diversity of healthcare leadership roles and experiences in the hospital. Given the researcher's position, it would have been ideal for the interviews to be conducted by a second researcher but, given the timeframe involved, it was difficult to organise and involve other individuals. Time was a significant constraint as the research had to be completed within a period of six weeks. Another limitation was the small sample size, which impacted the generalizability of the findings. Although data triangulation was carried out by incorporating in-depth interviews and online questionnaires, unfortunately there was insufficient time to conduct a quantitative study for further validation. These limitations should be considered when interpreting the study's results.

Conclusions

In conclusion, the combination of national healthcare policy, hospital leadership and management, and healthcare professionals is clearly influencing the progress of the hospital's QI efforts, providing inconsistent and sometimes insufficient support and guidance which limits QI efforts. The frustration around the lack of capability to develop a consistent KM infrastructure that enables the integration of national guidelines with clinical reality and supportive decision-making tools is tangibly felt and considered as crucial for the hospital's QI journey. However, the respondents' understanding of the problems and the collective desire to improve QI practice provides an opportunity for the improvement of KM practice through customised interventions.

Acknowledgment

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Conflict of Interest

The researcher is a medical professional with many years of leadership experience within the Maltese healthcare system.

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Authorship

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08 Knowledge and Awareness of Diabetes Mellitus Risk Factors among Educators in Primary Schools in Maltam at the Quality Department in a Maltese Hospital

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Abstract

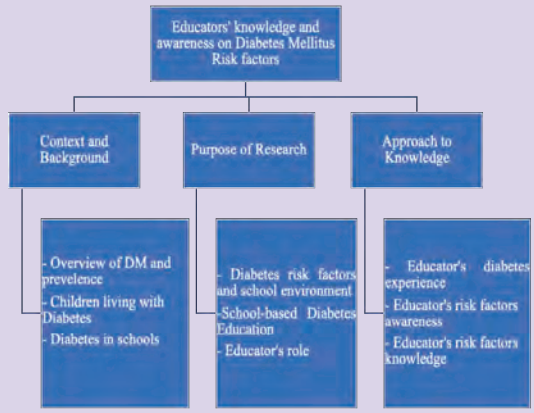
Objectives: The aim of this study is to investigate knowledge and awareness of Diabetes Mellitus risk factors in primary-age children among primary school educators in Malta, and to offer suggestions on how this subject can be addressed by professionals working in the education sector.

Methods: A deductive approach was used following a quantitative design, through normative descriptive survey. A questionnaire with mostly closed-ended questions was used to conduct the research. The questionnaires were distributed to different schools in Malta (state, private and church).

Results: A total number of 112 educators responded and completed the online questionnaire distributed amongst the chosen schools in Malta. Results show that there is a positive perception of 62.5% of the respondents agreeing and strongly agreeing that the school influences the students' lifestyle and eating habits. 40.1% of the educators show a notable lack of confidence in managing and identifying diabetes during school hours. Overall, a significant awareness of diabetes as a lifelong condition (94.6%) and the impacts of diet (89.3%) and lifestyle (83.9%) were reported. Participants show areas of awareness that can be improved, such as stress and trauma (58%) and identifying hypoglycaemia symptoms (75.9%). Furthermore, responses from open-ended questions enriched the study with valuable insights and suggestions for diabetes management in primary schools in Malta.

Conclusion: This study underlines the importance of implementing and developing targeted educational strategies for primary school settings to stimulate knowledge and awareness of diabetes risk factors.

Keywords: "Lifestyle"; "Diabetes Educator"; "Diabetes Management"; "School-based Diabetes Education".



Graphical Abstract

Highlights:

- There is a gap in knowledge among Maltese primary school educators about the risk factors for Diabetes Mellitus (DM), underscoring the need for enhanced health literacy to support students' well-being.
- The findings provide insights into the disconnect between teaching experience and awareness of DM risk factors.
- Primary school educators are interested in learning more about DM to improve their capabilities when it comes to dealing with children with diabetes.
- It is suggested that awareness-raising and professional development programmes be implemented to address the issue.

Abbreviations:

DM: Diabetes Mellitus
IDF: The International Diabetes Federation
ISPAD: The International Society for Pediatric and Adolescent Diabetes
KIDS: The Kids and Diabetes in Schools
MEYR: Ministry for Education, Sport, Youth, Research and Innovation
MREC: MEYR Research Ethics Committee

Introduction

According to Banday, Sameer, and Nissar (2020), Diabetes Mellitus (DM) is a chronic metabolic disorder with complex pathogenesis that affects individuals of all ages and requires lifelong management through lifestyle adjustments and/or medications. It is characterised by high blood glucose levels or hyperglycaemia, resulting from abnormalities in insulin secretion or action, or both.

Diabetes is also known to be one of the most common chronic conditions in children (Iken et al., 2023). In 2010, a study was carried out in Malta to estimate the prevalence of diabetes, and it shows that 9.8% of the population is diagnosed with diabetes. This data, despite its limitations, still showed the growing health problem in Malta (Ministry for Health, 2016). The lifestyle and risk factors have a profound impact on the development and management of DM. The World Health Organisation (WHO) (2023) highlights the close link between risk factors and the development of diabetes, showing that being overweight is the strongest risk factor for diabetes. Figure 1 further highlights the four risk factors associated with the development of DM.

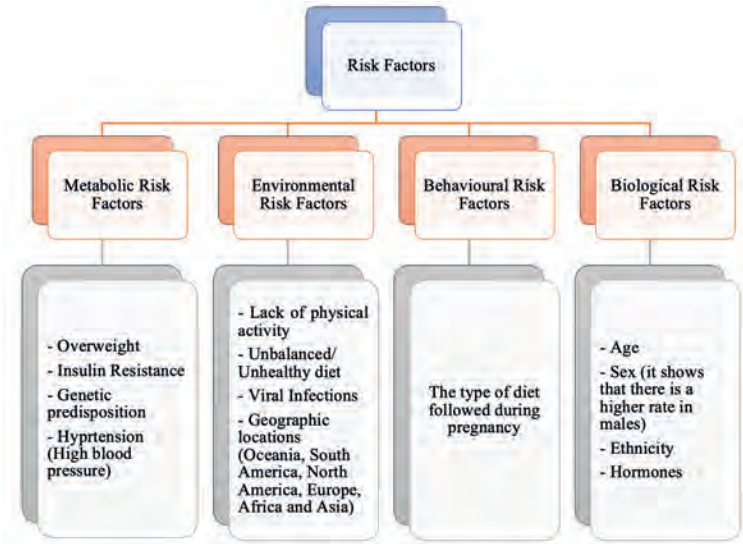


Figure 1 Diabetes Mellitus Risk Factors. Source: Arokiasamy et al, 2021

Research shows that among 21 geographic regions, South Asia, North America, and Middle East Europe have had the largest increase in childhood diabetes (Zhang, Kan, and Han, 2023). These countries have a common risk factor: a considerable amount of overweight or obese individuals (World Health Organization, 2023). Indeed, obesity and diabetes in adolescents have an impact on the transition to adulthood, as these two conditions are interlinked. Hence, it is important to recognize and understand the health consequences of this condition and that it can persist during the transition from childhood into adulthood (International Diabetes Federation, 2017).

Schools and educators play an important role in diabetes awareness and prevention. The Kids and Diabetes in Schools (KiDS) project, founded in 2013, serves as a good example for this. This project has highlighted the importance of promoting education on diabetes and healthy habits in the school environment and has also shed light on the hardships that children living with diabetes go through at school (International Diabetes Federation, 2013).

Primary schools are educational institutions which should equip students with the necessary knowledge and competences to address health challenges and promote health literacy, with the aim to help them develop decision-making skills and take appropriate action when it comes to their health (Bruun, 2000). Having a school philosophy that promotes health literacy, drives educators to promote knowledge and awareness towards health.

Thus, this research explores the level of knowledge and awareness regarding diabetes risk factors among primary educators in Malta, using an online questionnaire, and offers suggestions on how this subject can be addressed by professionals working in the education sector, as a strategy to overcome the growing diabetes epidemic in Malta, and its risk factors.

Methodology

Research Design

This is a normative, descriptive, and quantitative research based on a cross-sectional survey and guided by two research questions (RQ) as follows:

> RQ 1 – To what extent is knowledge and awareness on DM risk factors present among primary school educators in Malta?
>
> RQ 2 – How should the educational system improve the awareness of risk factors to overcome the increasing epidemic of diabetes in Malta?

The research questions address the term 'risk factors', which refers to both clinical (for instance, lack of physical activity) and non-clinical risk factors (for instance, low levels of education and diabetes knowledge).

The data was collected through a close-ended questionnaire with some open-ended questions, to further gather specific information from respondents (Bird, 2009). The population chosen for this study comprises educators working in primary schools selected across Malta. Three schools based in Malta from the state, church, or private sectors were randomly chosen.

In order to explore and examine the variables and the expected outcomes of the study, the following hypotheses were stated (Table 1).

Table 1 Study Hypotheses

Null Hypotheses (H0)	Alternative Hypotheses (HA)	Measurement Criteria
H01. Primary school educators in Malta do not have a good level of knowledge about risk factors for Diabetes Mellitus in primary-age children.	HA1. Primary school educators in Malta have a good level of knowledge about risk factors for Diabetes Mellitus in primary-age children.	Good level of knowledge means a median of at least 4 in the Likert scale of Section 4.1 of the questionnaire (or 75% of answers get from 4 and 5 on the Likert scale).
H01.1 There is no relationship between educators' level of education or professional experience with the level of knowledge about risk factors for Diabetes Mellitus in primary-age children.	HA1.1 There is a relationship between educators' level of education or professional experience with the level of knowledge about risk factors for Diabetes Mellitus in primary-age children.	The higher the level of education or professional experience, the better the level of knowledge about diabetes risk factors (section 2, items 1 and 4 versus section 4.1 of the questionnaire).
H01.2 There is no relationship between educators' personal experience of Diabetes and their level of knowledge about the risk factors for Diabetes Mellitus in primary-age children.	HA1.2 There is a relationship between educators' personal experience of Diabetes and their level of knowledge about the risk factors for Diabetes Mellitus in primary-age children.	The higher the personal experience on diabetes, the better the level of knowledge about diabetes risk factors (section 3 versus section 4.1 of the questionnaire).
H02. Primary school educators in Malta are not aware about risk factors for Diabetes Mellitus in primary-age children.	HA2. Primary school educators in Malta are aware about risk factors for Diabetes Mellitus in primary-age children.	The acceptable percentage of awareness among primary school educators is 75% (section 4.2, binary scale, on answers get "yes").
H02.1 There is no relationship between educators' level of education or professional experience with the level of awareness of the risk factors for Diabetes Mellitus in primary-age children.	HA2.1 There is a relationship between educators' level of education or professional experience with the level of awareness of the risk factors for Diabetes Mellitus in primary-age children.	The higher the level of education or professional experience, the higher the awareness of diabetes risk factors (section 2, items 1 and 4 versus section 4.2 of the questionnaire).
H02.2 There is no relationship between educators' personal experience of Diabetes and their level of awareness of the risk factors for Diabetes Mellitus in primary-age children.	HA2.2 There is a relationship between educators' personal experience of Diabetes and their level of awareness of the risk factors for Diabetes Mellitus in primary-age children.	The higher the level of personal experience on diabetes, the higher the awareness of diabetes risk factors (section 3 versus section 4.2 of the questionnaire).

To explain the relationship between the variables to be tested to prove the study hypothesis, a research model was designed (Figure 2):

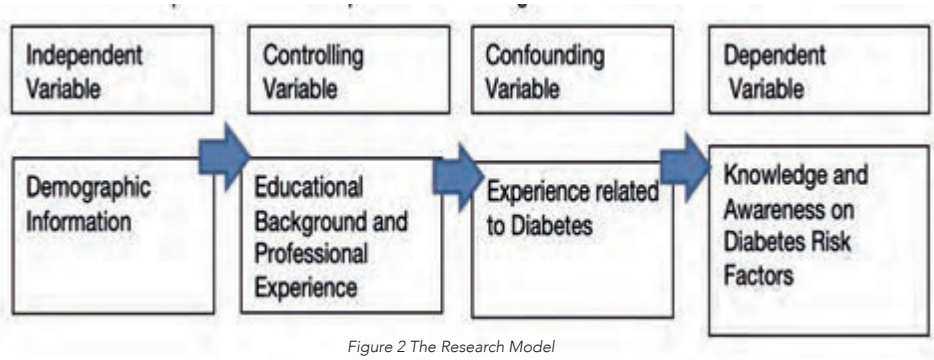


Figure 2 The Research Model

Data Collection and Analysis

For this cross-sectional survey, an online questionnaire was created through Google Forms (Supplement 1), and employed to systematically investigate the level of knowledge and awareness of the concerning increase of DM in children among all educators (Head of School, Assistant Heads, Senior Management Team, Teacher, and Learning Support Educators) in chosen primary schools. Findings emerging from the questionnaire led to recommendations for the enhancement of awareness about this phenomenon in order to overcome the increasing epidemic of diabetes in the Maltese education sector. The questionnaire was divided into the following sections: Section 1 – Demographic Information; Section 2 – Educational Background and Professional Experience; Section 3 – Experience related to Diabetes; Section 4 – Diabetes Risk Factors (4.1 Knowledge of diabetes risk factors; 4.2 Awareness of diabetes risk factors); and Section 5 – Open questions. Prior to administration, the questionnaire underwent face-to-face validity testing and reliability testing with a pilot sample. Upon the completion of the data collection phase, the responses gathered were imported to the SPSS software and analysis was conducted to determine if the hypotheses presented are supported or not.

To assess the educators' level of knowledge, the data from section 4.1 of the questionnaire was tabulated by trend, that is, by grouping Likert scale scores 1 and 2 (negative trend), score 3 remained isolated (neutral), and scores 4 and 5 (positive trend; good) were also grouped. The thresholder (>75%) was established according to Baig et al. (2020) considering: Knowledge score <50% = poor knowledge, 50-75% score = moderate knowledge, >75% score = good knowledge. A positive score indicates a positive attitude, and it might reflect a good level of awareness, also defined as high if over 75%. The Spearman test was conducted through the SPSS software, and relationships within the data were interpreted in relation with the research questions and hypotheses (H01.1 and H01.2 and H02.1 and H02.2).

Lastly, during the last stages of the data analysis process, important details on the experiences, opinions, and methods of teaching in the chosen schools in Malta emerged. Open-ended questions were included in the analysis, offering a variety of perspectives and further enhancing understanding of the topic.

Ethical Considerations

Prior to commencing the research process, a proposal was submitted and approved by the Institute for Education. this was followed by clearance from the Ministry for Education, Sport, Youth, Research and Innovation (MEYR), the Research Ethics Committee (MREC), the Secretariat for Catholic Education, and the heads of schools working in private schools. In order to avoid potential biases, an intermediary person distributed the questionnaire to all the educators working in the primary schools selected in Malta. Participants had access to the information letter which had to be filled in prior to completing the questionnaire. Anonymity and confidentiality were given the utmost importance in this research. and the data collected was only accessible to the researcher and kept in a safe place safeguarded by a password.

Results & Discussion

Primary School Educators in Malta: Brief Discussion on the Sample Profile

A total number of 112 educators participated in the study. A total of 35.7% of the participants were between 19 and 29 years old, 25% were between 30 and 39 years, 22.3% were between 40 and 49 years, and 16.1% were between 50 to 59 years. Only one respondent was over the age of 60 years. Additionally, 84.8% of the participants identified as she/her, 13.4% as he/his, and 2 individuals preferred to not share their identity. The most prevalent response on the ethnicity was Caucasian (68.8%), which shows a significant representation of educators identifying within this group. Additionally, the rest of the participants chose the category of 'other' (24.1%), showing that their race or ethnicity was not listed among the choices. The diversity is further emphasised by the responses showing 'Multicultural' (4.5%) and Asian, African American, and Native American all with a total of 0.9%. The majority of 97.3% educators are Maltese, while 2.7% indicated that they are not Maltese.

The diversity of educators coming from different backgrounds and roles is being recognised as a valuable resource for providing an inclusive learning environment (Jackson, 2021). From the online questionnaire, results show that various educators of different ages, genders, and race/ethnicities participated in the research. This was beneficial to the results since their knowledge and awareness levels were tested according to their real-life experiences.

Educational and professional experience factors are accounted for in the analysis, thus minimising their potential impact on the results. According to research, individuals that possess higher education levels and professional experiences can perform better and handle different tasks effectively (Kotur and Anbazhagan, 2014). However, according to the results presented in this study, the levels of education/professional experience seem to not have an impact on the specific knowledge of risk factors for DM.

Lastly, the features of the sample profile of primary school educators in Malta have an important role in defining the results of the study. Through the understanding of sample variation and comparison with relevant literature, the study provides a new understanding of the educators' experiences and awareness of DM risk factors and educational strategies.

Knowledge and Experience among Primary School Educators on Diabetes Mellitus Risk Factors

The investigation revealed a gap in knowledge and awareness of DM risk factors among primary school educators in Malta. In fact, although primary school educators in this study showed a certain level of knowledge of risk factors for DM, it did not achieve the "good level" as the responses in section 4.1 (related to Likert scale 4 and 5) were not equal to or greater than 75% (59.8%) and, despite the fact that the mean (3.7974) and median (3.7692) of the responses on this statements were close to 4, the null hypothesis (HO1) was not rejected. Thus, HO1: Primary school educators in Malta do not have good level of knowledge of risk factors for DM in primary-age children, was confirmed.

Upon evaluating the relationship between the educators' personal experience of Diabetes and their level of knowledge of the risk factors for DM in primary-age children, as indicated in Table 2, the results show that the level of education was slightly less than what was expected (good level, close to Likert scale 4). However, the level of education and duration did not impact the knowledge regarding the diabetes risk factors and experience related to diabetes (HA1.1; experience related to diabetes $p<0.001$). This implies that the relationship between the participants' experience with diabetes and their level of knowledge was negative. Despite the fact that the participants displayed great experience, they seemed to have a low level of knowledge regarding the subject.

However, this result may have been influenced by the fact that the majority of participants (Table 11; 76%) had no prior experience with diabetes. Therefore, the observed association between risk factors and experience (HA1.2; $p<0.001$; -0.326) should be carefully considered. The correlation coefficient (-0.326) indicates a moderate negative correlation between the variables, while the p-value (<0.001) suggests that this correlation is significant at the 0.01 level. Since the correlation is significant, the null hypothesis (H01.1) was rejected and the alternative hypothesis (HA1.1) was accepted.

Correlations				
			Knowledge of DM Risk Factors	Experience Related to DM
Spearman's rho	Knowledge of DM Risk Factors	Correlation Coefficient	1.000	-.326**
		Sig. (1-tailed)		<.001
		N	112	112
	Experience Related to DM	Correlation Coefficient	-.326**	1.000
		Sig. (1-tailed)	<.001	
		N	112	112

**. Correlation is significant at the 0.01 level (1-tailed).

Table 2 Risk Factors and Experience Related to Diabetes

Awareness among Primary School Educators on Diabetes Mellitus Risk Factors

In the second section of the questionnaire, the results showed that 79.8% of Maltese primary school educators are aware of DM risk factors (Table 3). Thus, the hypothesis (HA2) is accepted since the percentage of awareness among the participants is over 75%. It is important to note particularly the impact of lifestyle (83.9%) and the lifelong nature of the disease (94.6%). However, only 58% of participants is aware of the role that emotional stress and trauma play in triggering diabetes (Table 3), indicating a need for improved awareness in this area.

Statements related	Aware (%)	Unaware (%)	Total
Diabetes lasts a lifetime	106 (94.6%)	6 (5.4%)	112 (100%)
Lifestyle may affect incidence of diabetes	94 (83.9%)	18 (16.1%)	112 (100%)
Diet and eating habits impact the incidence of diabetes	100 (89.3%)	12 (10.7%)	112 (100%)
Emotional stress and trauma can trigger diabetes	65 (58%)	47 (42%)	112 (100%)

Table 3 Educators' Awareness of Diabetes Risk Factors

The correlation analysis was performed to assess the relationship between the awareness, educational level, and professional experience of participants working within Maltese primary schools (Table 3). The awareness of diabetes risk factors showed a weak positive correlation (HA2. level of education 0.006; p=0.475) with participants' educational levels.

Correspondingly, the correlation with the participants' work duration in the sector was negative (HA2.1; work duration -0.031; p=0.372). The correlation coefficient between Education and Duration was close to zero (-0.016; p-value 0.435). Table 4 shows results from educators' experience related to diabetes (HA2.2) and their awareness of diabetes risk factors. The correlation coefficient (-0.051) was weak and the correlations were not statistically significant (p=0.297) between the awareness of risk factors and the educators' personal experience (Table 4).

Correlational analysis (Table 4) revealed no significant link between the educators' knowledge of DM risk factors and their level of education or teaching experience. The relationship between the educators' level of awareness of diabetes risk factors and the duration of their teaching experience (years of work) showed a negative correlation (rs = -0.031; p=0.372), as presented in table 4. Thus, the null hypothesis (H02.1) was not rejected.

Correlations

			Risk Factor Awareness	Education	Duration
Spearman's rho	Risk Factor Awareness	Correlation Coefficient	1.000	.006	-.031
		Sig. (1-tailed)	.	.475	.372
		N	112	111	111
	Education	Correlation Coefficient	.006	1.000	-.016
		Sig. (1-tailed)	.475	.	.435
		N	111	112	112
	Duration	Correlation Coefficient	-.031	-.016	1.000
		Sig. (1-tailed)	.372	.435	.
		N	111	112	112

Table 4 Impact of level of education and/or professional experience on Diabetes Risk Factors

This is further supported by Table 5, which showed a weak negative association between education, experience, and awareness levels, showing that there is no relationship between the educators' personal experience of Diabetes and their level of awareness of the risk factors for DM in primary-age children (H02.2).

Correlations

			Experience Related to DM	Risk Factors Awareness
Spearman's rho	Experience Related to DM	Correlation Coefficient	1.000	-0.051
		Sig. (1-tailed)		0.297
		N	112	111
	Risk Factors Awareness	Correlation Coefficient	-0.051	1.000
		Sig. (1-tailed)	0.297	
		N	111	112

Table 5 Risk Factors Awareness and Experience Related to Diabetes

While overall awareness is high, there is room for improvement, and future educational programs should be implemented within Maltese primary schools. These programs would help educators better support students with diabetes, reducing risks such as hyperglycaemia during school hours and fostering a safer learning environment (Wolters & Daugherty, 2007; Chinnici et al., 2019).

The Effect of Educational Strategies for Improving Knowledge and Awareness of Risk Factors

Based on the responses from the open-ended questions, analytical themes (Figure 3) emerged regarding support and management of students with diabetes in an educational setting. The themes from the open-ended questions shed light on possible suggestions based on the perspectives of the participants.

Figure 3 Summary of Open-ended Questions - Keywords. Source: Buttigieg et al.,2005; Aziz et al.,2015; Qvortrup and Qvortrup, 2017; Kudlova et al., 2021.

The importance of ongoing professional development and training opportunities specifically catered for students with diabetes emerged as a particularly emphasised theme among participants.. The suggestions highlighted from the responses include CPD sessions, hands-on experiences, and professional talks from individuals working in the medical sector. Participants recognize the importance of being provided with opportunities to enhance their skills and knowledge to effectively support students with diabetes during school hours.

Awareness and Education are two important key features highlighted in the open-ended questions. The educators taking part in the questionnaire highlighted the importance of informative sessions, providing informative resources such as leaflets and booklets, and organising sessions and seminars to further increase the educators' understanding of managing diabetes at school and understanding diabetes.

Communication and collaboration are an effective method of implementation between stakeholders to further support students with diabetes. Educators highlight the importance of staff meetings and discussions between the students, educators, and parents. Through effective communication, support, and strategies for managing diabetes within the school environment need to be further discussed. First-aid courses, sharing real life experiences, the implementation of effective school policies, and promoting healthy lifestyle choices would further foster a supportive environment for diabetic students.

The potential of technology in supporting diabetes management and education is recognised by educators and suggestions from participants include the use of applications to monitor the glucose level of the student, accessing educational resources, and incorporating technology-based training to enhance the educators' skills and knowledge.

Lastly, the focus on policy implementation was highlighted in the open-ended questions. Participants highlighted that there is a need to establish and implement procedures and policies to aid students with diabetes during school hours. This ensures compliance with relevant regulations and guidelines to support students with this condition.

In addressing the prevalent situation of DM, specifically within the primary school educators in Malta, effective educational strategies emerge as a critical point. Designing and implementing effective educational interventions have an important role in the promotion of knowledge and awareness of risk factors.

Although the open-ended questions were created to ask different objectives from the respondents, responses were very similar, and all highlighted the importance of continuous training with regards to having students diagnosed with diabetes. Participants from this questionnaire worked from different sectors within the educational system. Wolter and Daugherty (2007) also highlight the importance that discussions and awareness campaigns in schools should be organised from individuals who are professionally specialised in this sector. This will further provide opportunities and safe spaces for educators to share their queries and concerns (Wolter and Daugherty, 2007).

Implementation Strategies Related to Awareness of Risk Factors to Overcome the Increasing Epidemic of Diabetes in Malta

DM is considered a serious health problem (Alibrahim et al., 2021), therefore promoting proper health education sessions would help increase knowledge to change attitudes among individuals. Schools which implement a health education strategy could provide further support and knowledge, thus further decreasing the chance of various risk factors (Kumar et al., 2022).

Local Implementation Strategies and Recommendations

Since DM is increasing worldwide and more primary-age children are being diagnosed, future studies in relation to diabetes education among primary-school-age children should consider further strategies for exploration and implementation within primary schools. Health literacy (HL) among young children is fundamental to cognitive, physical, and emotional development, thus making HL a valuable concept to provide individuals with skills and competencies (Kennedy and McLoughlin, 2022).

Incorporating longitudinal research could offer valuable data on the long-term effect of educational strategies and how student health outcomes are affected. In addition, if various studies across different educational sectors and regions are investigated, this would provide a more comprehensive understanding of what affects the educators' knowledge and awareness of diabetes risk factors. This research is based on a quantitative approach, but future studies might opt to use qualitative research where focus groups or interviews can be organised to further explore insights into the educators' perceptions and experiences in relation to diabetes education within primary schools. This recommendation is based on the results of RQ1, as more knowledge and awareness need to be presented among educators.

The findings in this study are consistent with prior research, further highlighting deficiencies in health literacy among educators (Collie and Perry, 2019). Moreover, the study shows that within the past and current curriculum being implemented, not enough strategies are being carried out across the educational sector. The implications of this are that educators, who play a critical role in the students' understanding, do not possess the necessary information about this subject and, hence, find it difficult to share and apply these practices during school hours. Thus, implementing targeted professional development programs and enhancing collaboration between the school and home may support and empower educators to enhance health education in schools in particular and in Malta in general (Gerhard Müller et al., 2013). Literature emphasizes the importance of early detection and lifestyle management, and schools play a vital role in promoting healthy behaviours (Akhtar et al., 2019). However, since demographic factors such as education level and experience were not significantly related to educators' knowledge of DM risk factors (Kuma et al., 2022), it is clearly implied that targeted interventions to improve DM knowledge are required to support educators in promoting health education (Sammut, 2021).

Therefore, policymakers should consider emphasising more on promoting health literacy among staff and students. Hence another recommendation would be organising opportunities such as professional development sessions where professionals would provide opportunities for educators to enhance their knowledge and awareness skills in diabetes management and prevention, while providing innovative resources and teaching methods. These sessions should include training, hands-on practice, and feedback which educators could eventually put into practice with their students during everyday life (Mizell, 2010). This recommendation is based on the results of RQ2, as these suggestions were extracted from the participants' responses highlighting the need of the implementation of effective strategies.

By taking into consideration these recommendations, policymakers and future studies can contribute to the promotion of health literacy and the importance of addressing risk factors related with DM among primary-school-age children.

Conclusions

The research findings show a valuable insight into the knowledge and awareness of primary school educators.

The findings suggest that primary educators, especially those educators with relative experience in diabetes, display knowledge and awareness regarding risk factors for DM in primary-age children, however there is a significant need to widen and spread this knowledge and awareness among all educators.

The research findings also show that primary school educators are interested in learning more about DM and what can be further done to enhance their capabilities when it comes to handling diabetes related issues. The strategies mentioned by the participants include cope sessions, professional development sessions, and informative talks from professionals who work in the Maltese health sector (of Malta). These sessions, as the participants suggested, should include real-life situations exposing them to practical knowledge and skills for managing diabetes within the school environment, where the students spend most of their day. By providing the educators with ongoing support and training, these sessions empower them to effectively support students with diabetes and to meet their needs.

Acknowledgement

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Conflict of Interest

The researcher is an educator at a Maltese primary school, but this school was not included in the research. The researcher was also not in direct contact with any of the research participants.

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09 Beyond the Screen: Virtual Reality in Immersive Marketing

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Abstract

Stepping into a world where reality blurs and imagination comes to life, Virtual Reality (VR) offers an unparalleled opportunity for brands to immerse consumers in captivating narratives. VR technology surpasses the limits of traditional advertising and forging profound connections with audiences. The study, through surveys and VR experiments, demonstrates VR storytelling's effectiveness as a transformative tool for marketers across various industries.

Objectives:
The primary objective of this study is to investigate how Virtual Reality (VR) storytelling impacts brand perception and consumer engagement. The research aims to demonstrate the effectiveness of VR as a marketing tool capable of creating immersive, emotionally resonant experiences that go beyond the limitations of traditional advertising. By focusing on VR's ability to forge deeper connections with consumers, the study seeks to provide insights into how brands can leverage this technology to enhance their marketing strategies.

Methods:
The study adopted a quantitative research approach, utilising both surveys and experiments to gather data. The sample was drawn from diverse social groups, including university peers and randomly selected individuals, using a stratified random sampling method to ensure a broad representation of the target population.

Data Collection involved two key methods:
1. Survey Questionnaire
2. VR Experiment

Data Analysis was conducted using quantitative methods, including descriptive and inferential statistics.

Results:
- VR storytelling significantly enhances brand perception, emotional connection, and brand loyalty.
- Survey responses indicated that 60% found VR marketing more engaging than traditional methods, 70% were more likely to try products after a VR experience, and 75% agreed VR created an emotional connection.
- The experiment showed substantial improvement in brand perception, interest in services, and likelihood to recommend the brand.

Conclusions:
The study concludes that Virtual Reality is a powerful tool for enhancing brand perception and consumer engagement. VR's ability to create immersive, emotionally engaging experiences can significantly improve how consumers relate to brands, foster loyalty, and influence purchasing decisions. The research recommends that brands invest in high-quality VR content tailored to specific audience segments to maximize the effectiveness of their marketing efforts. By doing so, businesses can stand out in competitive markets and strengthen their connection with consumers.

Keywords: "Virtual Reality", "Storytelling", "Brand Perception", "Consumer Engagement", "Immersive Marketing", "Emotional Connection", "Brand Loyalty"

Highlights:
- VR increases consumer emotional engagement and brand perception.
- Brands using VR are viewed as more innovative and trustworthy.
- VR storytelling encourages word-of-mouth advocacy and brand loyalty.
- Immersive VR experiences are effective in differentiating brands in competitive markets.

Abbreviations: **VR:** Virtual Reality

Introduction

Virtual Reality (VR) is a groundbreaking narrative technique that immerses the audience in three-dimensional worlds through VR technology. Virtual realism, frequently defined as an environment formulated with the help of a computer application or another media, is an environment where the person feels present. The concept of Virtual Reality involves electrical simulations of the surrounding environment through cognition mounted eye spectacles & wired cloths sanctioning, allowing the end user to interact with practical 3D conditions. The number of VR users grew rapidly, with potentially up to 171 cardinal progressive users in the era of 2018, with an estimated of 28 million persons prepared to pay for the available content (Bassano et. al. 2019). This is achievable due to massive development in the quality of VR commodities that help people outpouring from the physical experience and shallow immersion into virtual reality, along with the growing relevance of VR schemes in businesses such as video amusement, live contest, education, merchandising, real estate, healthcare, engineering science and military. It is anticipated that this tendency would be extending quicker in comparison with the case of smartphones and the World Wide Web. This is particularly because accessing advanced VR content does not require users to invest in expensive hardware. Instead, they simply need to add accessories to transform their smartphones into VR devices.

The evolution of technology has ushered in an era where users can experience the world around them in ways previously unimaginable. This transformation is not merely a shift in the way data is delivered but a profound change in the very fabric of our interactions with the world. As technology continues to advance, the scope and reach of VR have expanded, offering a tantalizing array of opportunities for businesses to revolutionize their marketing strategies and brand perception. Developments like Virtual Reality used in campaigns are transforming them into more powerful and immersive concept. (Dincelli and Yayla 2022).

Technology has effectively transitioned from a passive tool that receives information to a dynamic medium that can immerse users in entirely new dimensions. The rapid proliferation of software and applications has been the driving force behind this transformation. The software's quality and capabilities have grown exponentially, enabling businesses to seize the burgeoning market of virtual reality and employ it as a powerful marketing tool. In this context, virtual reality serves as a gateway to a new frontier in consumer engagement. It empowers businesses to create unique and compelling experiences that transcend traditional marketing boundaries. Brands can now transport consumers into a three-dimensional, interactive realm where they can not only learn about products and services but also experience them in ways that were once limited to the realm of science fiction.

The potential of virtual reality extends far beyond mere entertainment. It offers a means for businesses to redefine their approach to marketing. With virtual reality, companies can position themselves at the vanguard of a major shift in marketing communication. Through immersive experiences, they can communicate the value of their products and services with unparalleled efficacy. In this way, virtual reality represents a transformative leap in how businesses and brands engage with their audiences. Virtual reality is a catalyst for major changes in both the breadth and depth of marketing communication. Businesses that leverage the capabilities of virtual reality have a significant advantage in their efforts to reach and engage users. By adopting this cutting-edge technology, brands can not only enhance their marketing communication but also elevate consumers' understanding of the products and services they offer.

Moreover, the adoption of virtual reality by consumers is not merely a passive acceptance of new technology, it rather signifies a deeper transformation. Users increasingly expect richer, more engaging experiences that add value to their lives. Virtual reality applications continue to enhance the user experience by contributing to improvements in daily living. These factors underscore the crucial role of virtual reality in enhancing brand perception and the delivery of value to consumers. Businesses are now presented with an unparalleled opportunity to reach their target audience in novel, impactful ways. The integration of virtual reality into marketing strategies allows brands to not only convey their offerings but to immerse users in experiences that resonate with them on a profound level.

The increasing expectations of users and their desire for meaningful experiences make virtual reality a vital tool for modern enterprises. The convergence of consumer demand for richer, more immersive interactions and the growth of virtual reality technology propels businesses to embrace this medium to remain competitive. In doing so, brands can deliver more value to their customers and stand at the forefront of marketing innovation. When users are deeply immersed in a VR experience, they become brand advocates. They feel compelled to share their extraordinary encounters with friends and family on social platforms. The act of sharing is an endorsement of the brand, and it amplifies the brand's reach to a wider audience. This word-of-mouth marketing is particularly valuable, as it is rooted in authentic and emotional experiences (Grudzewski et. al. 2018).

The magical impact of Virtual Reality enhances its ability to create authentic experiences and an ambiance that extends beyond the limits of traditional visuals. Brands engage this exceeding feature to simulate their physical surroundings, articulating their brand civilization, and present immersive content pervading with their substance. An example of this would be L'Oréal's progressive conceptualization. They engage Virtual Reality as an instrument of recruitment, stipulating prospective employees with an immersive realistic journey of their business office, research lab, and retail store. This productive use of VR encloses the brand's workspace civilization and attribute, offering prospects a glance into their possible work surroundings before they ever stride foot on the physical site (Sung 2021). Unlike orthodox e-commerce, where persons engross in statistical pictures and textual depictions, VR transports the person into immersive brand existence. Brands could explicit their unique identification in an interactive and visually attractive mode. For illustration, Nike, a worldwide athletic footgear and apparel mortal, desired to stipulate soccer booster with an immersive and memorable experience. They developed a partnership with Administrator Adam Berg and Digital Field to develop Nike's introductory virtual reality drive focused on the Hypervenom II football shoe. The Hypervenom's second virtual reality content allowed users to step into the shoes of their popular soccer players and experience the game from a first- person perspective. This innovative campaign took advantage of Google's 360-degree video recording support, making it accessible on platforms like YouTube and Google Cardboard mobile device headsets, which were offered for free with each shoe purchase. The content was likewise congenial with the Oculus Rift, tapping into the emergent virtual reality marketplace. VR game narration, for example, permits the gamer to roll throughout a gaming area, but the integral storytelling stays uneconomical in the form of rewards that are much worthy of the attempt or may necessitate continuous endeavours. In component, kaleidoscopic narration, which dwells on dispersed narrative sub-plots, provokes the viewer or reader to actively engage in anticipating surprising yet formulaic connections(Van, Laer et al. 2019).

As virtual reality technology continues to evolve, businesses must adapt and seize the tremendous potential it offers. In leveraging virtual reality, brands not only create new modes of engagement but also stay at the cutting edge of marketing strategies. The convergence of technology and consumer expectations has set the stage for an exciting future, where businesses use virtual reality to engage and enrich the lives of their audience (Batat 2021).

Methodology

This chapter outlines the methodology employed in the study. It provides an overview of the research type, sample and sampling strategy, data collection methods, data analysis methodology, and potential limitations of the study. The methodology is designed to shed light on the interplay between virtual reality storytelling and brand perception, aligning with the research's aims, objectives, and research questions.

Research Type

The research type adopted for this study is quantitative research method. This choice is justified by the need to systematically investigate the impact of virtual reality storytelling on brand perception through structured data collection and analysis. The study employs surveys and experiments as data collection methods, focusing on quantifiable data and empirical observation. This research type enables the testing of specific hypotheses and the generation of generalizable knowledge related to the research questions.

Sample and Sampling Strategy

The sample for this research was drawn from diverse social groups, including university peers, randomly selected individuals, and social groups. The sampling strategy adopted was stratified random sampling. This approach ensured that the sample represented a cross-section of the target population, including individuals with varying levels of exposure to virtual reality technology and different brand perceptions. The diversity of the sample enhances the generalizability of the study's findings. A total of 241 people participated in this research, with 200 completing the survey and 41 participating in the experiment.

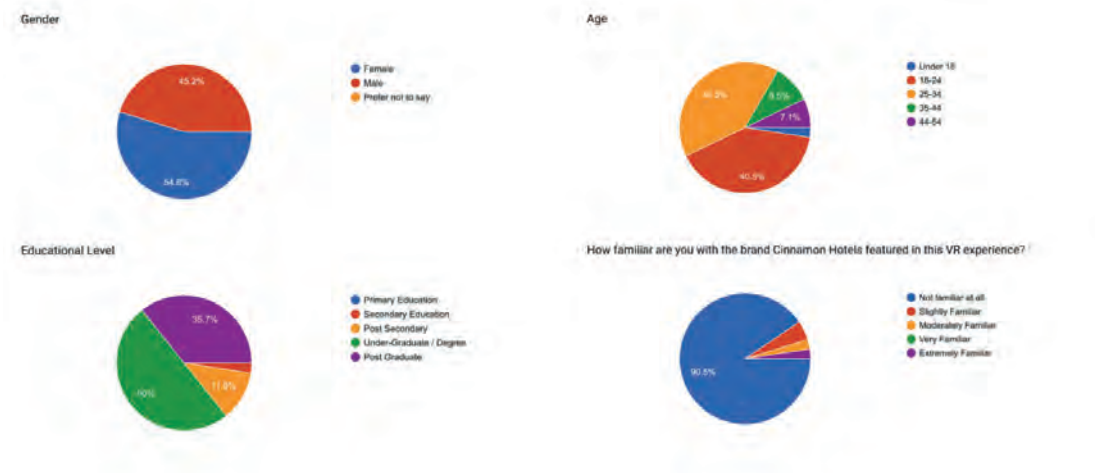
Data Collection Method

Data for the research was collected using two primary methods:

Survey Questionnaire: The survey questionnaire was administered to the sample, and 200 participants were asked a series of structured questions related to their experiences, perceptions, and attitudes towards virtual reality and brand perception. The questionnaire was distributed through various channels, including university peers, social groups, and random selection.

Experiment: An experiment was designed to immerse participants in a virtual reality encounter with a brand, Cinnamon Hotels. We included 41 participants from various social groups—selected randomly, including university peers and work colleagues.

Their demographics are as follows:



The focus was to directly witness how virtual reality storytelling influences brand perception, facilitated by the use of VR headsets. Before the immersive experience, participants filled out a prequestionnaire. Subsequently, a video played on the headset, followed by participants completing a post-experiment questionnaire with the same set of questions. This process allowed us to analyse how participants perceptions of the brand shifted after the VR experience.

Data Analysis Methodology

The data collected from the survey questionnaire and the experiment were subjected to quantitative data analysis. Statistical techniques, including descriptive statistics and inferential statistics, were used to analyse the data. The analysis focused on identifying patterns, relationships, and trends in the data, allowing for the testing of hypotheses, and drawing meaningful conclusions.

Methodology Limitations

Potential limitation of the methodology is the diversity of the sample. While the diversity enhances the generalizability of findings, it may also introduce variability in responses. Additionally, the use of self-reported data in surveys may be subject to social desirability bias. The experiment, while providing immersive experiences, may not fully replicate real-world consumer behaviour. Further research with a focus on specific industry experts or professionals from marketing or VR fields could provide deeper insights into the impact of VR storytelling on brand perception.

Results & Discussion

The introduction of this section serves as a bridge between the research findings and the objectives established at the outset. This segment briefly reiterates the objectives, followed by an outline of the structure to be employed throughout the Results and Discussion section (de Regt et al., 2021). The primary research questions that guided this study revolve around the impact of virtual reality storytelling on brand perception in immersive marketing strategies, the specific storytelling elements that influence consumers' perceptions of brands in virtual reality marketing, and the variations in consumer responses based on demographic and psychographic factors.

Survey analysis

In this section, we will provide an analysis of the survey data gathered from 200 respondents to understand their perceptions and attitudes toward virtual reality (VR) technology and its impact on brand perception.

Figure 1- Survey Analysis

The survey results indicate a generally positive attitude toward VR technology and its potential to enhance brand perception and consumer engagement. The majority of respondents expressed openness to VR experiences and recognized the capacity of VR storytelling to create stronger emotional connections with brands, make brands appear more innovative, and influence their purchasing decisions. These findings support the idea that VR can be a valuable tool in immersive marketing strategies and can significantly impact brand perception and consumer behaviour. Lim and Childs (2020) identified that it is also helpful to understand that all of these elements are making a significant impact on the positive brand perception and loyalty in the customer groups about the brand.

Experiment Analysis

Comparison of pre and post experiment

In the conducted experiment, the analysis of participants' responses before and after experiencing a virtual reality (VR) marketing campaign provides valuable insights into how their perception of both the brand and virtual reality itself changed as a result of the immersive experience (Chen and Yao 2022).

1.Perception of the Brand:

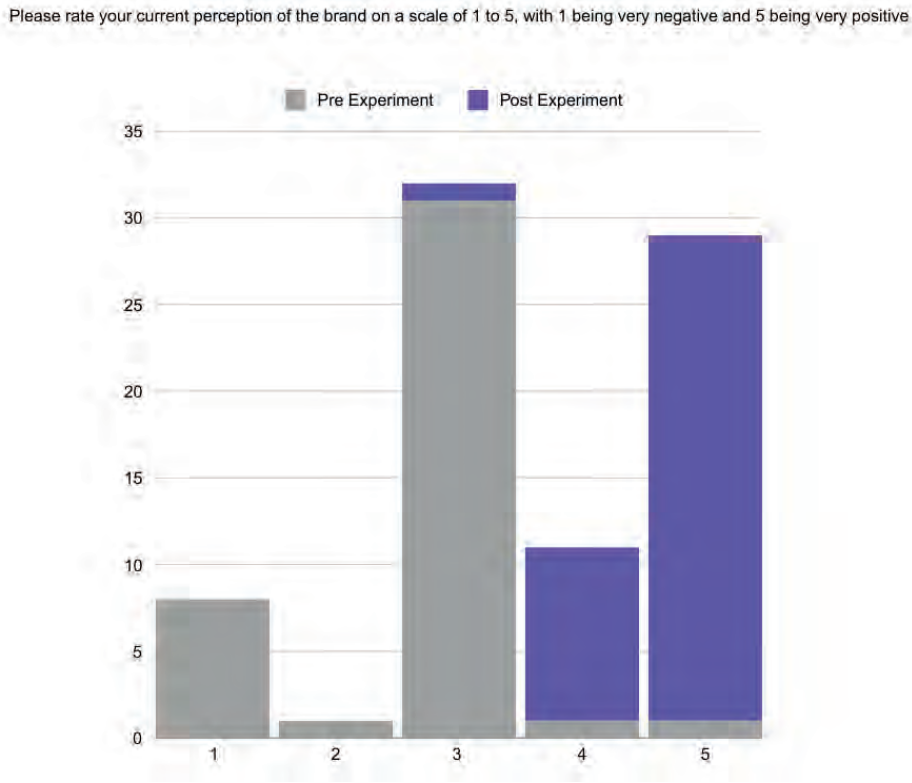


Figure 2- Comparison Chart- Brand Perception

2. Interest in the Brand's Services:

On a scale of 1 to 5, how interested are you in the brand's services? (1 = Not interested at all, 5 = Highly interested)

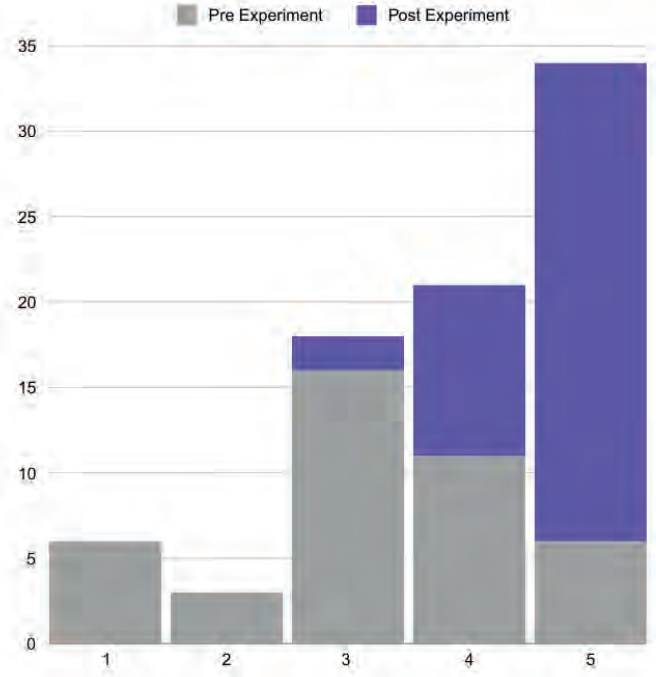


Figure 3- Comparison Chart- Interest in Brand

3. Emotional Connection to the Brand:

Please rate your current emotional connection to the brand on a scale of 1 to 5, with 1 being not emotionally connected at all and 5 being highly emotionally connected

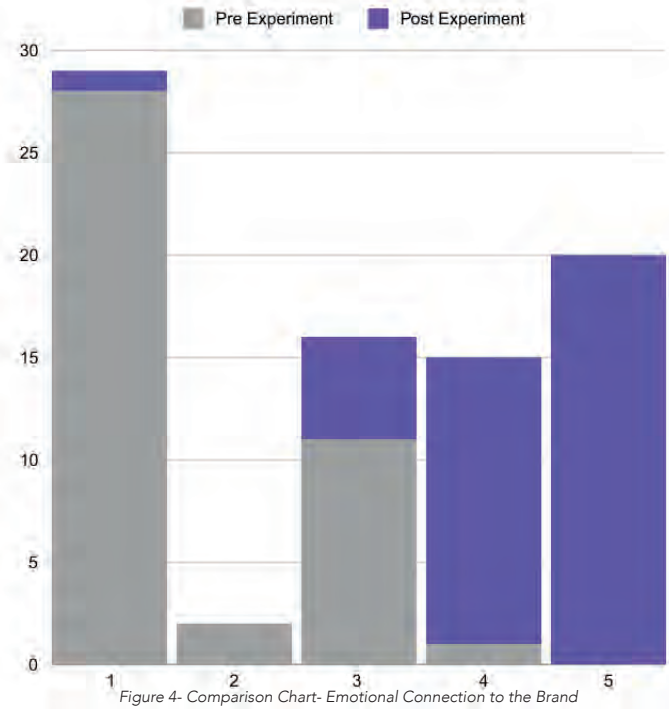


Figure 4- Comparison Chart- Emotional Connection to the Brand

4. Likelihood to Recommend the Brand:

On a scale of 1 to 5, How likely are you to recommend this brand to others in its current state? with 1 being very negative and 5 being very positive.

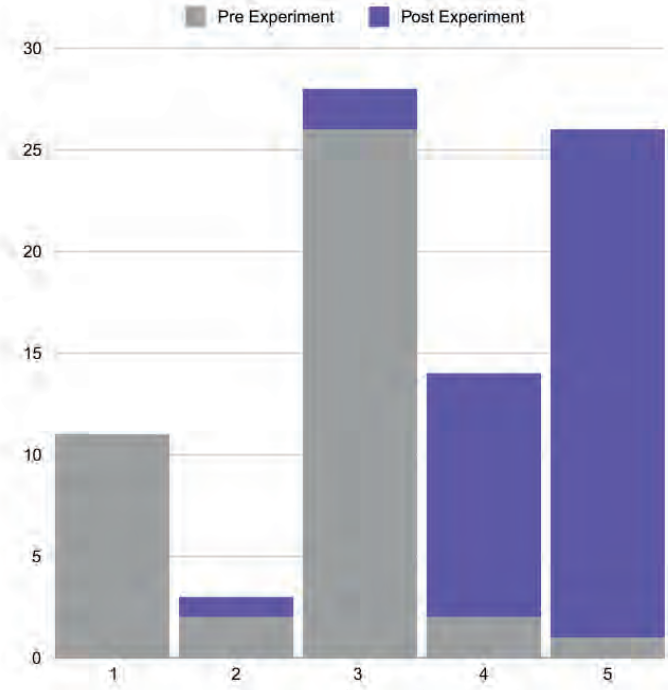


Figure 5- Comparison Chart- Brand Recommendation

5. Likelihood to Consider the Brand for Future Needs:

On a scale of 1 to 5, how likely are you to consider this brand for your future needs in its current state? (1 = Very unlikely, 5 = Very likely)

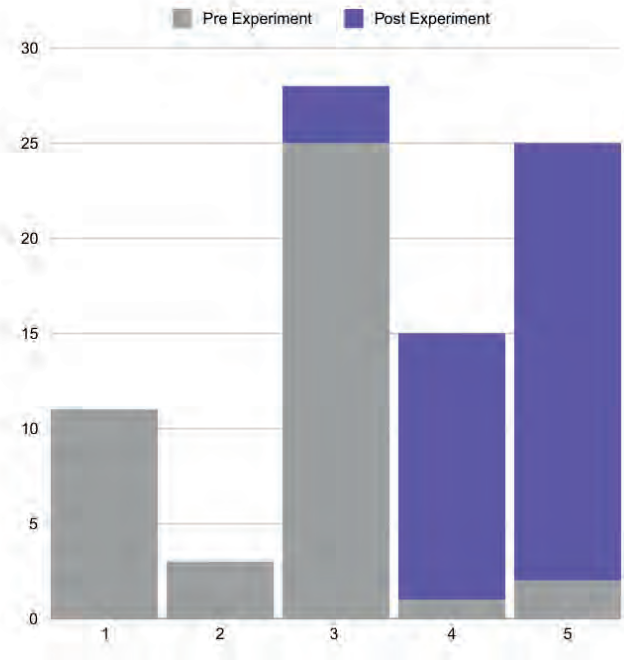


Figure 6- Comparison Chart- Consideration for future needs

	N	Minimum	Maximum	Mean	Std. Deviation
Please rate your current perception of the brand on a scale of 1 to 5, with 1 being very negative and 5 being very positive.	41	1.0	5.0	2.707	8730
On a scale of 1 to 5, how interested are you in the brand's services? (1 = Not interested at all, 5 = Highly interested)	41	1.0	5.0	3.293	1.1235
Please rate your current emotional connection to the brand on a scale of 1 to 5, with 1 being not emotionally connected at all and 5 being highly emotionally connected	41	1.0	3.0	1.634	.9153
On a scale of 1 to 5, How likely are you to recommend this brand to others in its current state? with 1 being very negative and 5 being very positive.	41	1.0	5.0	2.561	1.0012
On a scale of 1 to 5, how likely are you to consider this brand for your future needs in its current state? (1= Very unlikely, 5 =Very likely)	41	1.0	5.0	2.561	1.0500

Table 1 - Descriptive statistics of Pre experiment
Descriptive Statistics

Descriptive Analysis

The descriptive statistics provide valuable insights into participants' perceptions, interest, emotional connection, likelihood of recommending, and likelihood of considering the brand for future needs. These measures are essential for understanding the effectiveness of the brand's marketing and storytelling efforts.

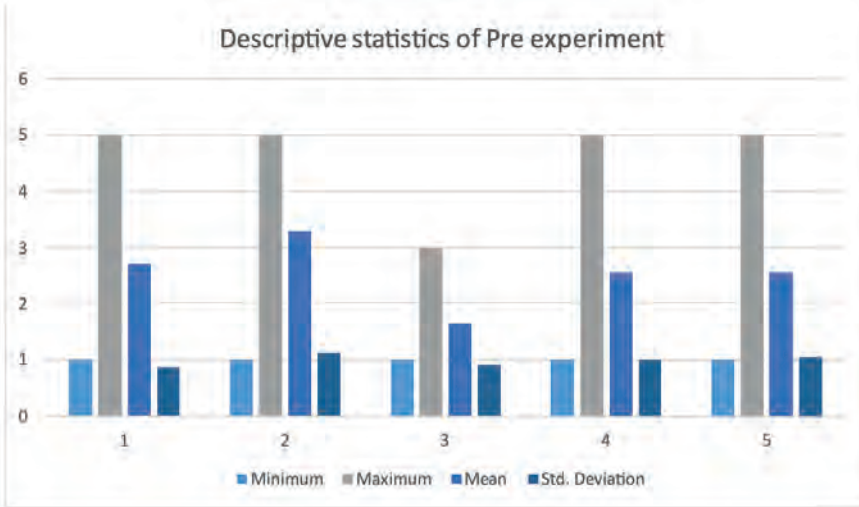


Figure 6 -Descriptive chart - Pre responses

	N	Minimum	Maximum	Mean	Std. Deviation
Rate your current perception of the brand after the VR experience on a scale of 1 to 5, with 1 being very negative and 5 being very positive.	41	3.0	5.0	4.707	.5120
On a scale of 1 to 5, how interested are you in the brand's services after the VR experience? (1 = Not interested at all, 5 = Highly interested	41	3.0	5.0	4.659	.5749
Rate the emotional impact of the VR experience on your connection to the brand on a scale of 1 to 5, with 1 being not emotionally connected at all and 5 being highly emotionally connected.	41	1.0	5.0	4.317	.8786
On a scale of 1 to 5, How likely are you to recommend this brand to others after the VR experience? with 1 being very negative and 5 being very positive.	41	2.0	5.0	4.537	.7105
On a scale of 1 to 5, how likely are you to consider this brand for your future needs after the VR experience? (1 = Very unlikely, 5 = Very likely)	41	3.0	5.0	4.512	.6373

Table 2 – Descriptive statistics of Post experiment
Descriptive Statistics

Descriptive Statistics

The descriptive statistics for participants' responses after experiencing the virtual reality (VR) marketing campaign reveal a significant positive impact on brand perception and related variables, demonstrating the effectiveness of immersive marketing strategies.

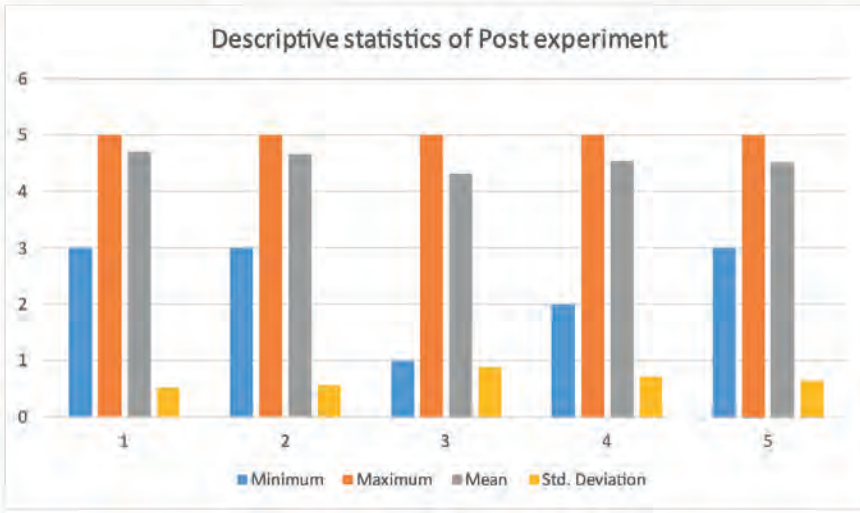


Figure 7- Descriptive chart - Post responses

T-Test

Pairs		Mean	N	Std. Deviation	Std. Mean Error
Pair 1	Please rate your current perception of the brand on a scale of 1 to 5, with 1 being very negative and 5 being very positive.	2.707	41	.8730	.1363
	Rate your current perception of the brand after the VR experience on a scale of 1 to 5, with 1 being very negative and 5 being very positive	4.707	41	.5120	.0800
Pair 2	On a scale of 1 to 5, how interested are you in the brand's services? (1 = Not interested at all, 5 = Highly interested)	3.293	41	1.1235	.1755
	On a scale of 1 to 5, how interested are you in the brand's services after the VR experience? (1 = Not interested at all, 5 = Highly interested	4.659	41	.5749	.0898
Pair 3	Please rate your current emotional connection to the brand on a scale of 1 to 5, with 1 being not emotionally connected at all and 5 being highly emotionally connected	1.634	41	.9153	.1429
	Rate the emotional impact of the VR experience on your connection to the brand on a scale of 1 to 5, with 1 being not emotionally connected at all and 5 being highly emotionally connected.	4.371	41	.8786	.1372
Pair 4	On a scale of 1 to 5, How likely are you to recommend this brand to others in its current state? with 1 being very negative and 5 being very positive	2.561	41	1.0012	.1564
	On a scale of 1 to 5, How likely are you to recommend this brand to others after the VR experience? with 1 being very negative and 5 being very positive.	4.537	41	.7105	.1110
Pair 5	On a scale of 1 to 5, how likely are you to consider this brand for your future needs in its current state? (1 = Very unlikely, 5 = Very ikely)	2.561	41	1.0500	.1640
	On a scale of 1 to 5, how likely are you to consider this brand for your future needs after the VR experience? (1 = Very unlikely, 5 = Very likely)	4.512	41	6373	0995

Table 3 – Pre and post VR experience paired sample test
Paired Samples Statistics

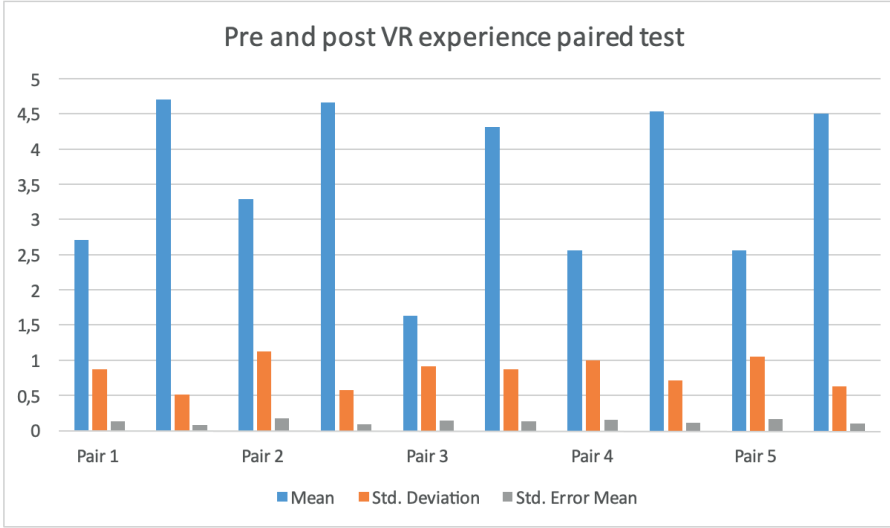


Figure 7- Paired test chart - Pre and Post responses

The paired sample t-test results indicate significant changes in participants' perceptions, interest, emotional connection, likelihood of recommending, and likelihood of considering the brand for future needs before and after the virtual reality (VR) experience. Let's examine each pair of variables and interpret the findings:

1. Perception of the Brand: The mean perception rating significantly increased from 2.707 before the VR experience to 4.707 after the VR experience. This difference of 2.000 points is substantial and statistically significant. The standard error of the mean is 0.0800. This significant improvement in brand perception is likely due to the immersive and positive impact of the VR content on participants. Participants went from having a moderately positive perception to a very positive one after the VR experience.

2. Interest in the Brand's Services: Participants' interest in the brand's services also saw a significant increase from 3.293 before the VR experience to 4.659 after the VR experience, with a difference of 1.366 points. The standard error of the mean is 0.0898. This finding suggests that the VR experience heightened participants' interest in the brand's services, reflecting the ability of immersive content to engage and captivate participants.

3.Emotional Connection to the Brand: The emotional connection to the brand experienced a noteworthy improvement, with the mean rating rising from 1.634 before the VR experience to 4.317 after the VR experience, a difference of 2.683 points. The standard error of the mean is 0.1372. This significant increase in emotional connection underscores the potential of VR to create deep and emotional brand experiences, fostering a stronger bond between the brand and consumers.

4. Likelihood of Recommending the Brand: Participants' likelihood of recommending the brand also increased substantially, with the mean rating going from 2.561 before the VR experience to 4.537 after the VR experience, a difference of 1.976 points. The standard error of the mean is 0.1110. This result demonstrates the persuasive power of the VR experience in influencing participants to become more inclined to recommend the brand to others.

5. Likelihood of Considering the Brand for Future Needs: The likelihood of considering the brand for future needs showed a significant improvement, with the mean rating rising from 2.561 before the VR experience to 4.512 after the VR experience, a difference of 1.951 points. The standard error of the mean is 0.0995. This suggests that the VR content effectively influenced participants to consider the brand for their future needs.

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Please rate your current perception of the brand on a scale of 1 to 5, with 1 being very negative and 5 being very positive. - Rate your current perception of the brand after the VR experience on a scale of 1 to 5, with 1 being very negative and 5 being very positive.	-2.0000	.8660	.1353	-2.2734	-1.7266	-14.787	40	.000
Pair 2	On a scale of 1 to 5, how interested are you in the brand's services? (1 = Not interested at all, 5 = Highly interested) - On a scale of 1 to 5, how interested are you in the brand's services after the VR experience? (1 = Not interested at all, 5 = Highly interested	-1.3659	1.1781	.1840	-1.7377	-.9940	-7.424	40	.000
Pair 3	Please rate your current emotional connection to the brand on a scale of 1 to 5, with 1 being not emotionally connected at all and 5 being highly emotionally connected - Rate the emotional impact of the VR experience on your connection to the brand on a scale of 1 to 5, with 1 being not emotionally connected at all and 5 being highly emotionally connected.	-2.6829	1.2538	.1958	-3.0787	-2.2872	-13.702	40	.000
Pair 4	On a scale of 1 to 5, How likely are you to recommend this brand to others in its current state? with 1 being very negative and 5 being very positive. - On a scale of 1 to 5, How likely are you to recommend this brand to others after the VR experience? with 1 being very negative and 5 being very positive.	-1.9756	1.0365	.1619	-2.3028	-1.6484	-12.204	40	.000
Pair 5	On a scale of 1 to 5, how likely are you to consider this brand for your future needs in its current state? (1 = Very unlikely, 5 = Very likely) - On a scale of 1 to 5, how likely are you to consider this brand for your future needs after the VR experience? (1 = Very unlikely, 5 = Very likely)	-1.9512	1.1169	.1744	-2.3038	-1.5987	-11.188	40	.000

Table 4– Paired Sample Test

The paired samples test conducted on the post-VR experience responses compared to the pre VR experience responses provides compelling evidence of the substantial impact of the VR marketing campaign on various aspects of brand perception and consumer behavior.

1. Perception of the Brand: The significant negative mean paired difference of -2.0000, along with a low standard deviation of 0.8660, indicates a remarkable improvement in participants' perception of the brand after the VR experience. This finding is underscored by a p-value of 0.000, signifying high statistical significance. The participants' brand perception shifted from an initial less positive rating to a significantly more favorable one. This result is of utmost importance for marketers, highlighting the effectiveness of the VR campaign in enhancing brand perception and potentially reshaping how consumers view the brand.

2. Interest in the Brand's Services: The negative mean paired difference of -1.3659, combined with a standard deviation of 1.1781, reflects a significant increase in participants' interest in the brand's services after the VR experience. The p-value of 0.000 indicates a highly significant change. This result suggests that the VR campaign successfully ignited greater interest among participants in the brand's offerings. Such a significant boost in interest is a promising indicator of the potential of VR to engage and captivate consumers, increasing their inclination to explore and engage with the brand's services.

3. Emotional Connection to the Brand: The substantial negative mean paired difference of -2.6829, accompanied by a standard deviation of 1.2538, demonstrates a significant strengthening of participants' emotional connection to the brand after the VR experience. The p-value of 0.000 underscores the high statistical significance of this result. The VR content effectively deepened the emotional bond between participants and the brand. This finding suggests that VR is a powerful tool for evoking emotional responses and fostering stronger, more emotional brand-consumer relationships, a key goal for many businesses.

4. Likelihood of Recommending the Brand: The negative mean paired difference of 1.9756, with a standard deviation of 1.0365, signifies a significant increase in participants' likelihood to recommend the brand after the VR experience. The p-value of 0.000 further confirms the high statistical significance. The VR campaign effectively influenced participants to become more inclined to advocate for the brand. This result is pivotal for businesses seeking to leverage positive word-of-mouth marketing and underscores the persuasive impact of VR experiences on participants' propensity to recommend the brand.

5. Likelihood of Considering the Brand for Future Needs: The mean paired difference of -1.9512, with a standard deviation of 1.1169, highlights a significant increase in participants' likelihood to consider the brand for their future needs after the VR experience. The p-value of 0.000 affirms the high statistical significance. The VR content effectively influenced participants to be more likely to choose the brand for their future requirements. This result emphasizes the potential of VR to shape consumer preferences and increase future engagement with the brand.

Conclusions

This study explored virtual reality (VR) storytelling's impact on brand perception and consumer engagement. The results highlight the potential of VR as an innovative marketing tool, showing its ability to significantly enhance brand perception. VR's immersive experiences create lasting impressions, improving how consumers relate to brands.

Key Findings:

1. VR's Positive Impact on Brand Perception: Participants' perceptions improved after experiencing VR content, showcasing its ability to shape brand impressions.

2. Emotional Connection: VR increases emotional engagement, crucial for brand loyalty and long-term relationships. Emotional responses through VR enhance brand affinity.

3. Word-of-Mouth Advocacy: The likelihood of recommending brands post-VR experiences increased, underlining VR's role in fostering brand advocacy through word-of-mouth marketing.

4. Influence on Consumer Behavior: VR positively influences actions like trying products, seeking VR experiences, and considering brands for future purchases.

5. Innovative Brand Image: VR can make brands seem more modern and innovative, a crucial aspect in maintaining competitiveness.

6. Transparency and Authenticity: Consumers are more likely to trust brands that offer transparent VR experiences, reinforcing the demand for authenticity in marketing.

7. Competitive Differentiation: VR storytelling helps brands to stand out by providing immersive, memorable experiences that differentiate them in saturated markets.

8. Audience Segmentation: While the impact of VR is overall positive, different consumer segments may respond differently, indicating the need for tailored VR marketing approaches.

Recommendations

1. Invest in High-Quality VR Content: Prioritize immersive, well-crafted VR experiences as they significantly impact brand perception (Scholz and Smith 2016).

2. Tailor VR to Specific Segments: Customize VR experiences for different audience groups based on demographics and preferences for maximum effectiveness.

3. Strengthen Emotional Storytelling: Focus on VR experiences that elicit strong emotional responses and resonate with brand values (Cowan and Ketron 2019).

4. Ensure Transparency and Authenticity: Brands must deliver honest VR content to build trust, avoiding exaggerated claims that could damage credibility.

5. Leverage VR for Product Demonstrations: Industries like automotive and real estate should use VR for product demonstrations and virtual tours (Wang and Chen 2019).

6. Encourage User-Generated Content: Consumers are more willing to share their VR experiences. Brands should encourage this content to extend their campaign reach.

7. Monitor Technological Advancements: Stay updated on VR technology trends and adapt strategies as more affordable and accessible VR hardware becomes available (Loureiro et al. 2019).

8. Measure and Analyze VR Impact: Use robust analytics to track the impact of VR on brand perception, emotional engagement, and purchase intent.

9. Prioritize User Education and Accessibility: Educate consumers about VR and ensure the content is accessible to broaden reach (Hollebeek et al. 2020).

10. Integrate VR into Multi-Channel Strategies: Align VR with other marketing efforts to ensure a consistent brand message across platforms.

11. Establish Ethical Guidelines: Brands should develop ethical standards for VR content, ensuring experiences are respectful and inclusive (Dincelli and Yayla 2022).

12. Innovate and Experiment: Continuously explore new applications for VR to stay competitive and relevant.

13. Education and Training for Marketers: Invest in educating marketing teams about VR's potential applications for creating effective campaigns (Rauschnabel et al. 2019).

Incorporating these recommendations can help brands fully leverage VR storytelling to improve brand perception and consumer engagement. As VR technology evolves, it offers exciting opportunities to create immersive, emotionally engaging marketing experiences that drive brand loyalty and advocacy.

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