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Alignment of project portfolio to strategic priorities using AHP.

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All content, analysis, conclusions, and opinions expressed in this study are my sole responsibility.

Nombre: CESAR DAVID DERAMOND BERNALES.

Fecha: Click or tap to enter a date.

For Ilana & Sofía, you two are the driving force
behind every good decision I have ever made
-like aiming for this grade-.

Ilana, truly nothing will ever compare to being your father:
You are my favorite "person" in the entire world,
a blessing unparalleled,
and a source of boundless joy in my life.

Abstract

This master's thesis aims to apply the **Analytic Hierarchy Process (AHP)** to prioritize strategic projects in a global distribution and retail company, **Inchcape Americas**. The methodology involves defining and reviewing the hierarchy of factors, collecting, and analyzing data, running AHP analysis using SuperDecisions software, and evaluating the results and applicability. The results of the AHP analysis rank five types of projects according to their weights and priorities; accompanied by sensitivity analysis that tells how stable those results are. The study concludes that the AHP approach is a useful and practical decision support framework for project prioritization, and that the proposed hierarchy and criteria are consistent and applicable to the context of Inchcape Americas.

Key terms: AHP, project prioritization

Executive summary

Project prioritization is a critical process for any organization that needs to allocate resources and achieve strategic goals. However, many project prioritization methods are subjective, inconsistent, or lack transparency. This master's thesis proposes a novel application of the Analytic Hierarchy Process (AHP) to prioritize strategic projects in a global distribution and retail company, Inchcape Americas.

The AHP is a multi-criteria decision-making method that allows decision makers to compare alternatives based on their relative importance with respect to a set of criteria. The AHP decomposes a complex problem into a hierarchy of factors, assigns weights to each factor using pairwise comparisons, and calculates the overall scores and rankings of the alternatives.

The study follows a four-step methodology: (1) defining and reviewing the hierarchy of factors for project prioritization; (2) collecting and analysing data from 15 stakeholders using online surveys; (3) running AHP analysis using SuperDecisions software; and (4) evaluating the results and applicability of the AHP approach.

The results of the AHP analysis rank five types of projects (operational excellence, customer experience, employee engagement, digital transformation, and sustainability) according to their weights and priorities. The study also performs a sensitivity analysis to examine how the changes in the criteria weights affect the project rankings. The study finds that operational excellence and customer experience are the most important types of projects, while sustainability is the least important one. However, the sensitivity analysis reveals that the rankings are not stable and may vary depending on the preferences of the stakeholders.

The study concludes that the AHP approach is a useful and practical decision support framework for project prioritization, and that the proposed hierarchy and criteria are consistent and applicable to the context of Inchcape Americas. The study also discusses the limitations, implications, and recommendations for future research.

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1 Introduction

When it comes to selecting a strategic project, there are several key considerations that must be considered. These include the cost of the project, the potential benefits and returns on investment, the timeframe for completion and implementation, and any associated risks. Additionally, it is important to consider any external factors such as technological advances and industry trends that may impact the success of the project. Finally, it is important to determine whether the project aligns with your organization's overall mission and goals.

By taking all these factors into account, organizations can use an Analytical Hierarchy Process (AHP) to evaluate possible projects and make an informed decision about which one to pursue. This process involves breaking down each factor into sub-categories and assigning weights according to their importance. The AHP then uses these weights to determine which project offers the most value in terms of cost/benefit analysis and risk management. With this approach, organizations can select a strategic project that meets their current needs while also positioning them for long-term success.

In this work AHP will be applied to the context of a global distribution and retail company, the largest independent distributor in the world Inchcape (LON: INCH) and its Americas business unit. Key strategic projects are handled within one PMO that is expected to prioritize among all those projects.

A proper hierarchy will be defined and reviewed, the results of the analysis and further applicability of the analysis into their process.

2 Origin & purpose of the study

In this document we aim to understand the process in which Inchcape Americas aligns their strategic projects pursuits to such priorities.

It comes as no surprise that one of the greatest challenges in modern organizations is driving alignment and focus, in this study we will dwell on the relationship between purposed strategic goals and a recommendation of projects to pursue as part of the yearly roadmap.

In the context of this organization -as one would expect from global companies- there are many agendas clashing: local versus global, commercial versus operational, centralization versus decentralization, and so on.

In the study case, we will list the strategic priorities as per the current strategy statements; identify the different strategic projects as identified by the company's PMO[1]. As expected, there's a resource constraint that impedes the organization from pursuing all the projects, yet projects from different sources are not easily comparable among them: how do you choose between a data project and a marketing one? An infrastructure versus a health and safety one? The only clear point is that legal and compliance projects must be done within the timeline that the legislator imposes.

As a support to the decision-making process an AHP (Saaty, 1990) approach will be applied as a proof of concept and evaluated.

[1] Project Management Office

3 Objectives

3.1 General Objectives

GO1. Evaluate the practical application of a decision support framework such as AHP into the project prioritization of Inchcape Americas.

3.2 Specific Objectives

The specific objectives for this work are stated as follows:

SO1. Design and determine the hierarchy of factors for prioritizing projects.

SO2. Run AHP process and determine consistency.

SO3. Evaluate results and applicability.

4 Scope statement

The scope for this study covers the Americas region for a given year of study, considering all 2023 project pipeline.

In this study, different dimensions involved in the decision-making process will be identified and used for the design of the hierarchies. Expert input from key stakeholders of the organization will be used in order to run the analysis.

The results of the AHP analysis will be evaluated to determine the relative importance of the different criteria. A consistent rank of weights will be proposed, and the applicability of this rank to regional scenarios will be evaluated.

Finally, the deliverable of this study will be the rank of weights in a given hierarchy and, assuming correct applicability, a way forward to implement.

5 Methodology

The intended methodology to follow in this study is summarized in Figure 1. Following a description of each stage of the work:

- Literature Review. Identify, select, and review relevant literature using AHP, project prioritization and Multiple Criteria Decision Analysis (MCDA), common grounds and criteria will be identified, and the expected outcome is to have an initial hierarchy of the criteria.
- Gather feedback from key stakeholders in the organization. Having an initial hierarchy, the next step is to gather relevant feedback from key stakeholders, interviews will be conducted with these key people in other to validate assumptions and dimensions of the hierarchy.
- AHP Analysis. Following standard procedure for AHP analysis (Azevedo de Souza et al., 2022; Saaty, 1990) using a standard tool: SuperDecisions software.
- Evaluation and applicability. At this stage, results from AHP will be evaluated and the ranking of weights will be qualified. Using such a framework for qualifying projects at PMO level will be determined, applicability will be assessed as per current knowledge of the organization.

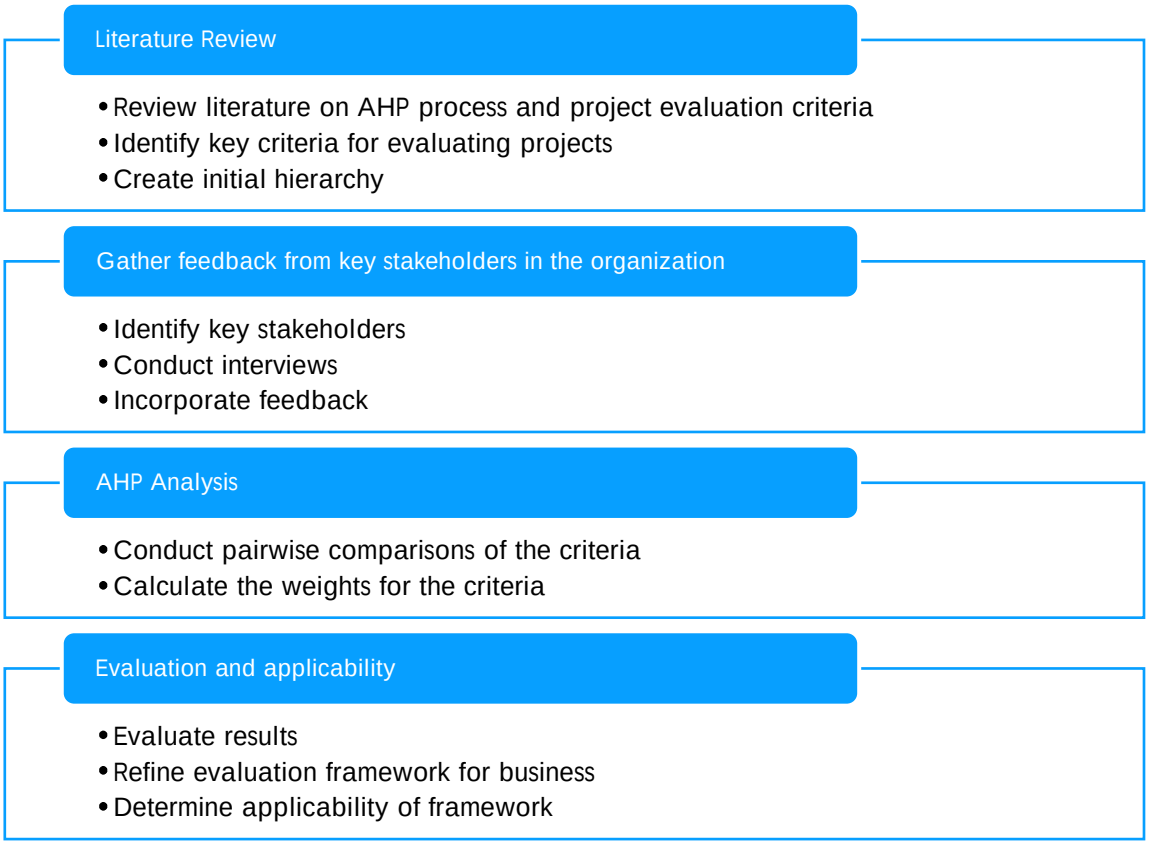

Figure 1: Methodology of the study.

6 State of the art

As the theoretical framework for AHP is already established (Saaty, 1990, 2009), the focus of this excerpt will be mainly on applied cases that can be used to prove useful for the problem.

6.1 Literature review

Literature found was grouped among the following categories:

Category	Description	Book or article
AHP & tools	This group covers books and articles that helped with understanding AHP, and Superdecisions software. Application and use case may not relate to the problem at hand.	(Mu & Pereyra-Rojas, 2018; Munier & Hontoria, 2021; Saaty, 1990, 2009; Saaty & Ergu, 2015)
Applied cases	This group have applications of AHP/ANP, to analogous problems as stated in this work.	(Azevedo de Souza et al., 2022; Jafarzadeh et al., 2022; Shaygan & Testik, 2019; Vijayakumar et al., 2022)

Table 1: Categorization of literature

6.1.1 AHP & tools

As the literature is ample for this topic, going to the roots of AHP and understanding the framework proposed by Dr. Saaty, helps mainly to grasp the baseline assumptions, in this case: the independence of the criteria. This assumption is highly relevant at the moment of defining the criteria and hierarchy. As per the decision problem, environment and other considerations, no relevant concern is found; this application of AHP is a standard application within a corporate environment -which takes care on the rational aspect of the decision-maker.

Since the analysis itself concerns with inconsistencies, it will be further reviewed on the development of the study.

As per (Munier & Hontoria, 2021) called "Uses and Limitations of the AHP Method", it aptly calls the considerations when building the model. For this case, mathematical

considerations and criticism will be left out, and the focus will be on identifying this case as a good fit:

- The problem at hand is strictly based on considerations and evaluations of the criteria.
- The criteria are relatively compared, based on subjective preferences.
- No future or time dependency or inter-temporal considerations.

Finally, the dominant software is Superdecisions, in (Mu & Pereyra-Rojas, 2018) it is possible to get specifics and instructions for specific, rating scale, and group-decision models; as well as sensitivity analysis. This is a comprehensive manual on effectively using the tool.

6.1.2 Applied cases

For this category papers related to MCDA[2] on project selection and evaluation. Application of AHP were considered.

The main themes, findings, gaps, and controversies in literature, as well as the theoretical frameworks and models that underpin the review.

The aim in this case is to identify key criteria to be considered for the development of the Hierarchy in the coming sections. On the other hand, reviews, shortcomings and recommendations on the selected literature provide source for future modifications on the method.

6.1.2.1 Regarding criteria for project prioritization.

In first study reviewed (Azevedo de Souza et al., 2022) author compared the classical iron trinity of project management (Scope, Cost, Schedule) as well as several other criteria for evaluating project success, as grouped by the author: means, end (or goal) and future. Each category were amounted to 3 or 4 sub-criteria as to no affect eigenvectors of AHP (a common error).

As per results, and not all surprisingly, the estimated weights for evaluating success in projects using AHP, at less than 10% CR[3] are as follows:

- Learning opportunity 20.0%
- Scope 15.8%
- Innovation 14.1%
- Cost 8.7%

Secondly an application of fuzzy logic and AHP (Shaygan & Testik, 2019), is focused and consistent in the application, however it prioritizes based on root cause

[2] Multiple Criteria Decision Analysis

[3] Consistency Ratio, a common measurement for AHP

analysis of a specific problem: underperformance of a hospital scheduling process. Though definitely an interesting approach, it has low applicability to the problem at hand.

Another application of fuzzy logic is for determining global weights after determining the hierarchy (Vijayakumar et al., 2022). The hierarchy focuses heavily on financial metrics: NPV, IRR, Benefit cost, Payback, investment, and break-even time.

Finally, in the work of (Jafarzadeh et al., 2022), although not using AHP but tools such as Z-number Quality Function Development (ZQFD) and several MCDM[4] methods. this comprehensive study clearly calls out criteria and looks for their relevance into project selection using above mentioned methods. In terms of the criteria, they align with standard project management and above studies (see Table 2), although in the study they also link the expected benefit.

Selection criteria (HOWs)	Benefits (WHATs)
▪ Alignment with strategic objective ▪ Risk of project ▪ Acceptance and support of senior management ▪ Tech requirements ▪ Complexity of the project ▪ Dependency to other projects ▪ Alignment between team skills and project needs ▪ ROI of project ▪ Project transparency requirements ▪ Innovation required ▪ Flexibility in time and project activities ▪ Implementation cost ▪ Alignment of project manager skills to the project ▪ NPV of earnings	➢ Contribution to corporate strategic goals ➢ Maximize the value of the portfolio ➢ Acceptance by users ➢ Minimize the risk ➢ Balance in the portfolio of projects ➢ Organizational performance ➢ Proper stakeholder management

Table 2: Criteria & benefits (Jafarzadeh et al., 2022)

As observable only some of those HOW's are quantifiable, and also we see common groups: Financial, stakeholders, and people/growth.

[4] Multiple Criteria Decision-Making

6.1.2.2 Regarding shortcomings.

As mentioned above the count of sub-criteria among the hierarchy has to be relatively even in order to get effective results with AHP (Azevedo de Souza et al., 2022), this important learning will be considered should this work ends up creating sub-criteria.

As per (Vijayakumar et al., 2022), the bias over financial measurement contradicts the other studies where there are many other criteria that could have been used in the hierarchy.

A common thread in the studies reviewed is the handling of uncertainty, reliability of the decision makers, and the sensitivity, i.e. how would the prioritization be affected by a change of opinion on the DM. In this regard hesitation and sureness is addressed by using fuzzy logic and numbers theory (Jafarzadeh et al., 2022; Shaygan & Testik, 2019).

7 Development

Having reviewed selected literature and following the methodology proposed, the time for application is due; in the subsequent sections the key steps of the work and outcome will be described.

7.1 Discovery process: interviewing key stakeholders

In current organization most key projects are sponsored by seniors leader of the organization, however, such sponsorship only implies that project results are desired by the leader, not that they are necessarily involved in the project.

The key stakeholders identified are as follow:

- Director of operational excellence
- Head of PMO for strategic projects
- Head of Digital PMO
- Head of distribution excellence

The interviews followed a free flow conversation that covered following topics: *what qualifies a project as strategic, how can you tell whether a project is doing well or not; how do you prioritize projects, what are your criteria*.

In using the notes from those conversations, a contrast to the literature reviewed was identified, as the iron triangle didn't emerge as the most relevant. Additionally, pre-execution considerations are heavily focused by the leaders, in other words, the reason to

pursue a given project; however, the odds of success or whether it achieves its promise was not preeminent in the interviews.

Though all are aware that picking a project is not enough to guarantee its correct execution, not even for PMO's was a primary concern.

As highlighted in the next section, from interviews is that dimensions related to strategy, value and finance originated.

7.2 Stablishing the Hierarchy

Defining or prioritizing projects within an ample scope such as the one found in Inchcape, is possible to find from Brick & mortar projects to Artificial Intelligence. One common thread is the need to correctly assign the limited time, attention, and balance to the ongoing business responsibilities.

Another characteristic is the uncertainty or lack of elaborated project plans, project plan in the PMI[5] sense, i.e. detailed execution, monitoring and risk management plans. In other words, you don't have much details about the project other than the initial statement of work.

Above points joint in the suggested hierarchy of this work, which narrows down the focus on iron triangle and detailed financial evaluation since its purpose is to decide whether it makes sense to keep investing time of the organization into more detailed planning.

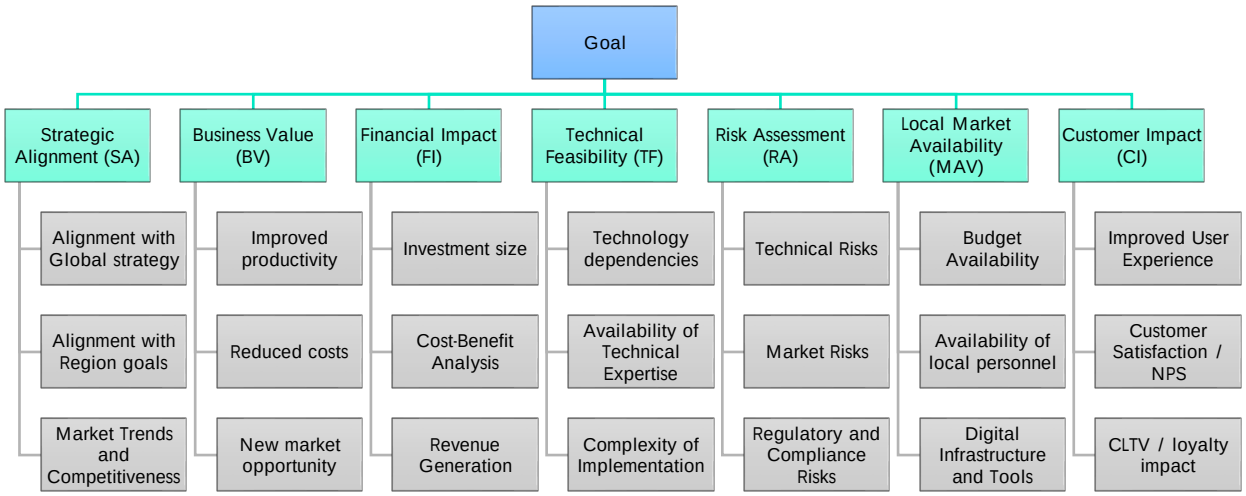

Figure 2: Proposed Hierarchy

[5] Project Management Institute, (www.PMI.org)

In Figure 2 you may observe the proposed hierarchy, it considers seven criterias with even sub-criterias at lower level (following the best practices).

Although self-explanatory, we will define the different criteria and separate among those that would seem to be colinear. In Table 3 are listed as well as a common KPI that could be associated with the high-level criteria, though not necessary for AHP, the KPI suggestion helps understand how the criteria are different among themselves in the aim.

Criteria	Definition
Strategic Alignment (SA)	Alignment with the company's business goals and strategy. KPI: Alignment Score with Business Strategy
Business Value (BV)	What is the potential value that the projects will create to the business. KPI: Incremental cost reductions
Financial Impact (FI)	The potential financial benefits and impact of the projects. KPI: ROI (Return on Investment)
Technical Feasibility (TF)	The feasibility of implementing the projects from a technical perspective. KPI: % of compliance with corporate tech stack
Risk Assessment (RA)	Evaluation of potential risks associated with the projects. KPI: Risk Severity Assessment
Local Market Availability (MAV)	Availability of resources necessary for the successful execution of projects. KPI: Budget Availability
Customer Impact (CI)	The impact of projects on customers, user experience, and satisfaction. KPI: Net Promoter Score (NPS)

Table 3: Criteria definition & common KPI

7.2.1 Strategic Alignment (SA)

As part of the tension among global or local projects as well as nuances of a multidimensional matrix organizations, what is key for the strategy can have multiple

directions. In the case of the study company, it presents as the tension between "global projects" and "local projects" as well as the celerity of each.

Alignment or strategic fit aims to capture the desire of delivering such project within the context of local market needs and goals.

7.2.2 Business Value (BV) vs Financial Impact (FI)

It aims to compare the hard financial calculation on the second criteria, which are specifically aimed to working capital and bottom-line impact; versus the less quantifiable, yet crucial projects that improve and enhance the business.

The better example based on the author's observation: the need to reduce TCO[6] by consolidating all digital platforms under a common infrastructure is a key project and by the sheer financial numbers is critical; however, it is a complex project that impacts business operations and requires considerable attention: should we allot a semester of business into this endeavour, in spite of smaller yet growth projects? In this case, it would be expected to appear in the pairwise comparison between BV and FI.

7.2.3 Technical Feasibility (TF) vs Risk Assessment (RA)

TF aims to the several dependencies within Technology landscape and the overall complexity of the project; whereas RA focuses on the specific risk profile of the project, an inward view of the project scope.

An example case would be in digital projects where specific platforms are required to be working in order to create value for the specific project, think a machine learning model that feeds customer segments into Salesforce Marketing Cloud:

- One TF consideration would be the availability and reliability of Salesforce Marketing Cloud platform.
- A RA consideration would be the availability and quality of the data used in the machine learning model.

7.2.4 Other criteria

In the case of Local Market Availability and Customer Impact (MAV and CI, respectively) the criteria are clear on its considerations.

It is specified with a clear target of the local market, which is the location in which the project will be executed. Since the project team is assumed to be available, what matters is whether the expect users and stakeholders required for the project are as well.

[6] Tocal Cost of Ownership

In the case of CI projects that are customer facing, should have clear targets in terms of satisfaction or loyalty.

7.3 Creating the Superdecisions model

With the hierarchy properly defined, it comes to the tool to create the model and input the judgements.

Since it will be a ratings model, Superdecisions[7] provides the functionality on a separate screen. As shown on Figure 3, the relationship between Goal: prioritizing key projects up to the lower level of the hierarchy must be explicated in the model, prior to making judgement and adding the ratings input.

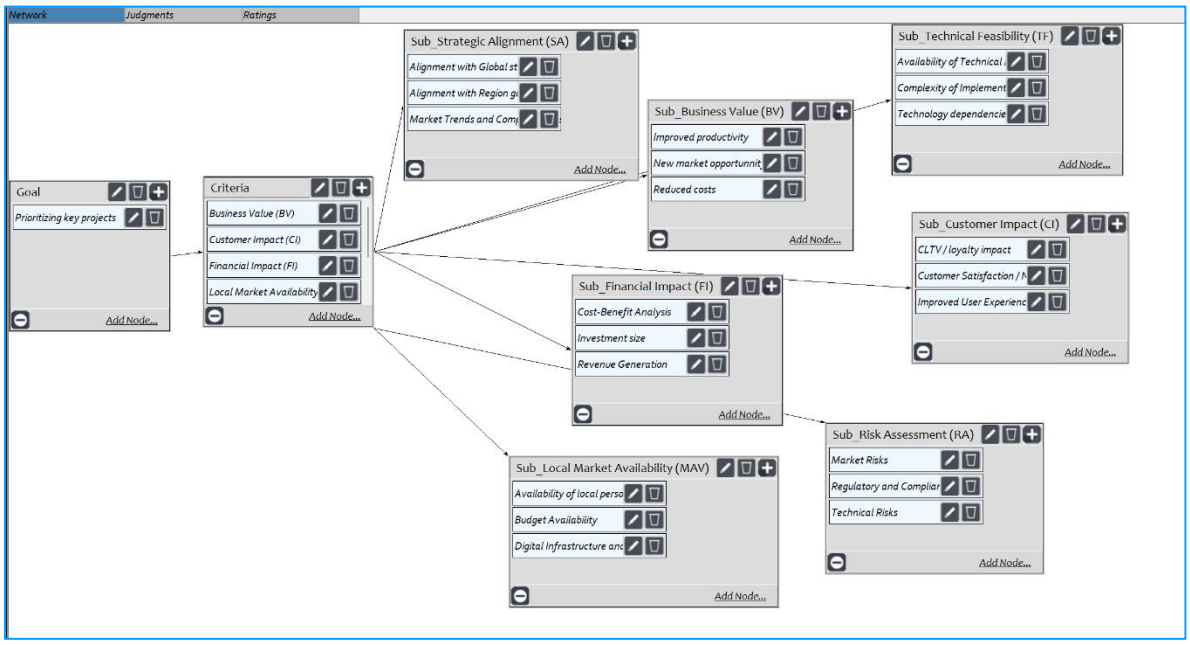

Figure 3: Superdecision model for proposed hierarchy.

In the following section, a deep dive into the pairwise comparisons and inconsistency among.

[7] Version used is Superdecisions v. 3.2.0.

7.4 Stablishing judgment across hierarchy

In this section the different consistency ratios will be reviewed. Initially pairwise comparison among the criteria, as shown on the following tables.

Needless to say, the results listed here are after reviewing initial judgments and correcting where Inconsistency was above 0.2; as the best practice suggests.

Inconsistency	*0.0896*	
Name	Normalized	Idealized
Strategic Alignment (SA)	0.410708926	1
Business Value (BV)	0.218474302	0.531944373
Financial Impact (FI)	0.165518109	0.403005873
Local Market Availability (MAV)	0.071819096	0.174866167
Technical Feasibility (TF)	0.051165137	0.124577613
Customer Impact (CI)	0.048863306	0.11897308
Risk Assessment (RA)	0.033451124	0.081447277

Table 4: Criteria consistency

On Table 5 you may observe in ordered fashion the importance of the different criteria, based on the pairwise comparison. With a inconsistency below the recommended threshold of 0.10, it looks acceptable.

Unsurprisingly, we can observe that SA leads the hierarchy, similar to what was observed in Error! Reference source not found. above. Although BV and FI are close by looking at the numbers, BV qualifies clearly above with a score 3 times more important than FI.

Inconsistency	*0.05156*	
Name	Normalized	Idealized
Alignment with Region goals	0.690959092	1
Alignment with Global strategy	0.217638476	0.314980262
Market Trends and Competitiveness	0.091402432	0.132283421

Table 5: Strategic Alignment consistency

As per Table 5 highly influenced by the context and operating model of the subject organization. With a good consistency we see a strong dominance of the regional goal over the global ones, although not part of the scope of this study this is a correct statement, observed as well in the source and value propositions of the different projects.

Inconsistency	*0.09609*	
Name	Normalized	Idealized
Reduced costs	0.75040706	1
Improved productivity	0.171344795	0.228335799
New market opportunity	0.078248145	0.104274265

Table 6: Business Value consistency

Highly influenced by the current economical cycle -and the automotive industry- in the Americas region with recession in Chile, Colombia and slow recovery on Perú, it can be observed in Table 6 we see cost reduction and augmenting productivity as the dominant value sources for projects. Projects that free working capital, generate savings will indeed be more relevant for the business.

At the change of the tides, finding new opportunities might become more relevant: launching a new brand, opening a new store, and so on.

Inconsistency	*0.03703*	
Name	Normalized	Idealized
Investment size	0.636985572	1
Revenue Generation	0.258284994	0.405480133
Cost-Benefit Analysis	0.104729434	0.164414138

Table 7: Financial Impact consistency

Similarly, it can be seen on Table 7, influenced by the context provided above, plus the integration efforts of a large scale M&A, the premium would be on the size of the investment.

Inconsistency	*0.08247*	
Name	Normalized	Idealized
Digital Infrastructure and Tools	0.673810571	1
Availability of local personnel	0.225535499	0.334716475
Budget Availability	0.10065393	0.149380158

Table 8: Local Market Availability consistency

On Table 8, unsurprisingly Budget is the least important factor, mainly because is a binary situation: if there is no funding the project is done. Whereas the availability of people and the digital landscape can impact the desirability of the project at a larger extent, and allows for subjective evaluation across the projects.

Inconsistency	*0.09609*	
Name	Normalized	Idealized
Complexity of Implementation	0.750407189	1
Technology dependencies	0.171344653	0.22833557
Availability of Technical Expertise	0.078248158	0.104274265

Table 9: Technical Feasibility consistency

Again, for Technical Feasibility (Table 9) good consistency is shown as complexity of implementation is strongly the most important feature, 6 and 7 times more important respect to the other sub-criteria.

A side note is required for Availability of Technical expertise, common sense implies that it shouldn't be a problem for a large global company since you may hire or bring a vendor; however, that's not completely true when looking under the lens of global versus regional projects, which is one why this feature was included in the hierarchy.

Inconsistency	*0.05156*	
Name	Normalized	Idealized
Improved User Experience	0.527836133	1
Customer Satisfaction / NPS	0.332515928	0.629960525
CLTV / loyalty impact	0.139647939	0.264566842

Table 10: Customer Impact consistency

As per Table 10, it is observed the preference of User Experience over NPS, which reflect the strategic bet of the company on Omnichannel strategy rather than traditional retail & distribution.

Inconsistency	*0.07069*	
Name	Normalized	Idealized
Regulatory and Compliance Risks	0.614410656	1
Technical Risks	0.268368573	0.436790232
Market Risks	0.117220771	0.190785707

Table 11: Risk Assessment consistency

Unsurprisingly, on Table 11 we see compliance and regulatory as the main feature; this is a correct statement as any project tied to the Regulator is a must do, so in truth is not a matter of prioritization.

As per the rest of sub-criteria, Technical risks is much more tangible than market's, since it is owned internally, allowing a better predictor of the problems the project might have.

8 Results of the analysis

Finally, in terms of the options, instead of listing 100+ projects currently on the portfolio of the PMO, mainly a scale problem. Author has defined types as per each portfolio[8], meaning one representative project that will be rated for the model.

Name	Characteristics
Bespoke projects	Hyper localized projects, mostly on the tech side. Could be a specific portal or a BI dashboard, may or may not use Internal Digital Delivery Center (Inchcape DDC).
DAP projects	These are wide range data products from A.I. to traditional BI, specialized projects with a dedicated delivery team.
Digital projects	Projects from digital marketing sphere, CRM and Digital experience platform.
Infrastructure	Property management projects and facilities, these are projects with a physical component (brick and mortar). From opening a new point of sale to offices.
IT platforms	IT projects comprises new platforms implementation (ERP[9] and DMS[10]), upgrades, migration to cloud.

Table 12: Project portfolios for rank evaluation.

For the ratings on each sub-criteria we used the provided scales on SuperDecisions, which give standard qualifications, two main scales were used (see Figure 4):

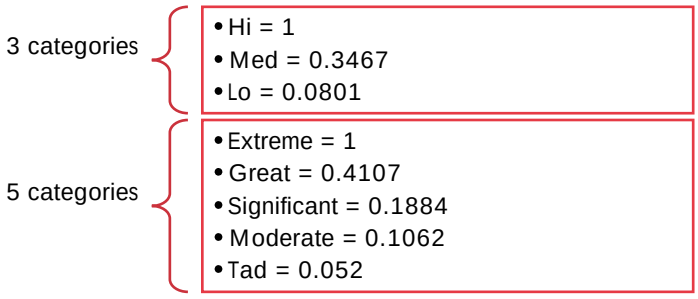

Figure 4: Superdecision standard scales and their values

[8] Portfolio is defined by the PMI as: "A collection of projects or programs or other work grouped together to facilitate effective management of work to meet strategic business objectives".

[9] Enterprise resource planning

[10] Dealer management system

In some of the ratings 5 categories where used, as the case of higher segmentation among the projects could be made. For the rest ample buckets is preferable, since is merely subjective evaluation.

Finally, after rating all the projects, the model suggests weights and priority as shown on Table 13:

Ranking	Name	Ideals	Normals	Raw
#1	Infrastructure	1	0.297513	0.297513
#2	DAP projects	0.66904	0.199047	0.199047
#3	IT platforms	0.64814	0.192829	0.192829
#4	Digital projects	0.62623	0.186313	0.186313
#5	Bespoke projects	0.41779	0.124298	0.124298

Table 13: Rated output & priorities

Surprising results! At first glance, it would seem the flashiness of DAP and Digital projects does not translate well into the prioritization, however, remember the objective of AHP is to put all subjective evaluations into play.

One possible explanation is that infrastructure projects are simpler and absolutely aligned with regional and global objectives (they go into all investment committees before even starting). Whilst digital, IT and DAP, have emergent complications and risks that makes the projects harder to execute, value and alignment to the side.

In Annex 1, you may observe the ratings for each of the sub-criteria.

8.1 Sensitivity analysis

For sensitivity analysis we are looking to understand how much variation is possible to receive on each of the categories and obtain the same results. In this case, the analysis will be focused on the top 3 hierarchies that are close to each other (see Table 4) and how likely is to see a ranking reversal.

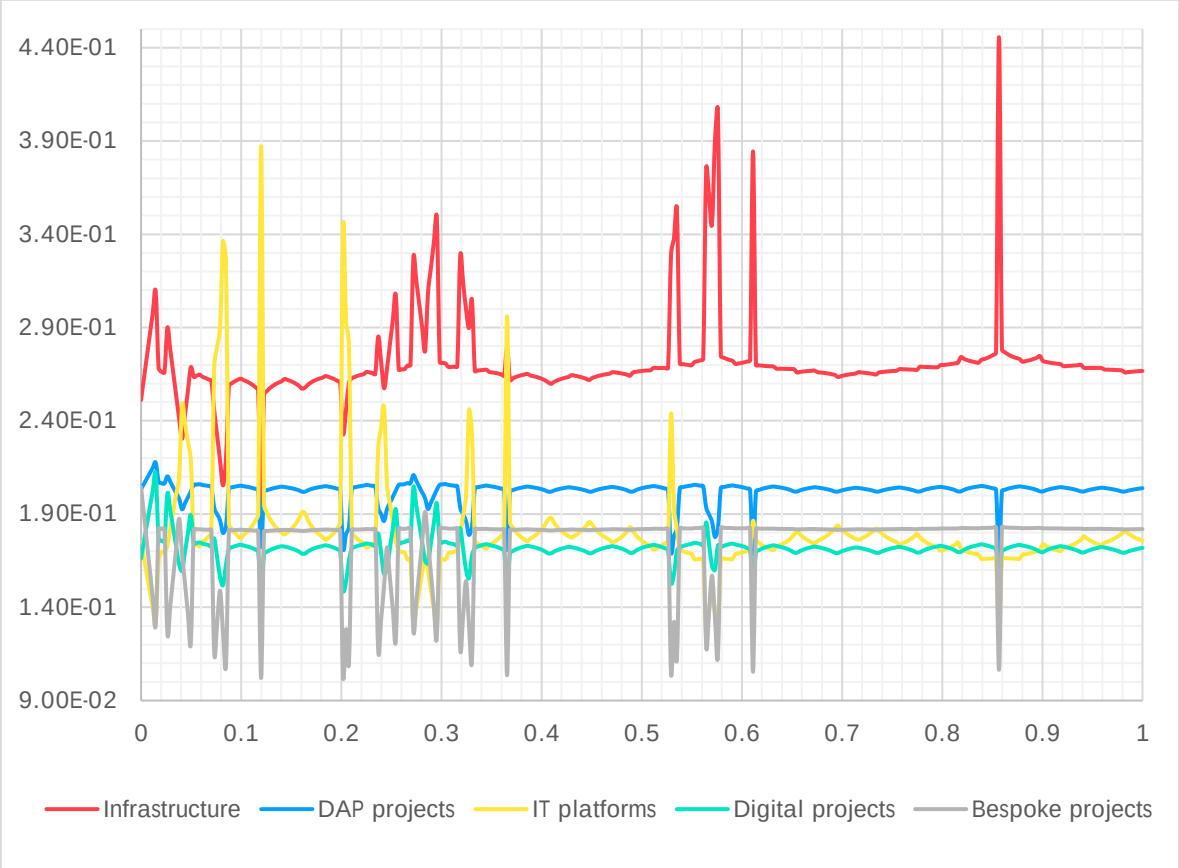

Figure 5: Top 3 criteria sensitivity to project prioritization

For this analysis changes on the consolidated value of SA, BV, and FI, would impact the ranking as presented on Table 13.

Initially, low variability for #2 and #4 projects is observed, with scarce scenarios in which they move up. Additionally, the distance from Infrastructure to the rest is noticeable.

Interestingly you never see a rank reversal between #1 and #2, but yes between #1 and #3, which occurs in 4 different occasions (see Figure 6), also note in all of those #2 moves down 1 position consistently with the reversal.

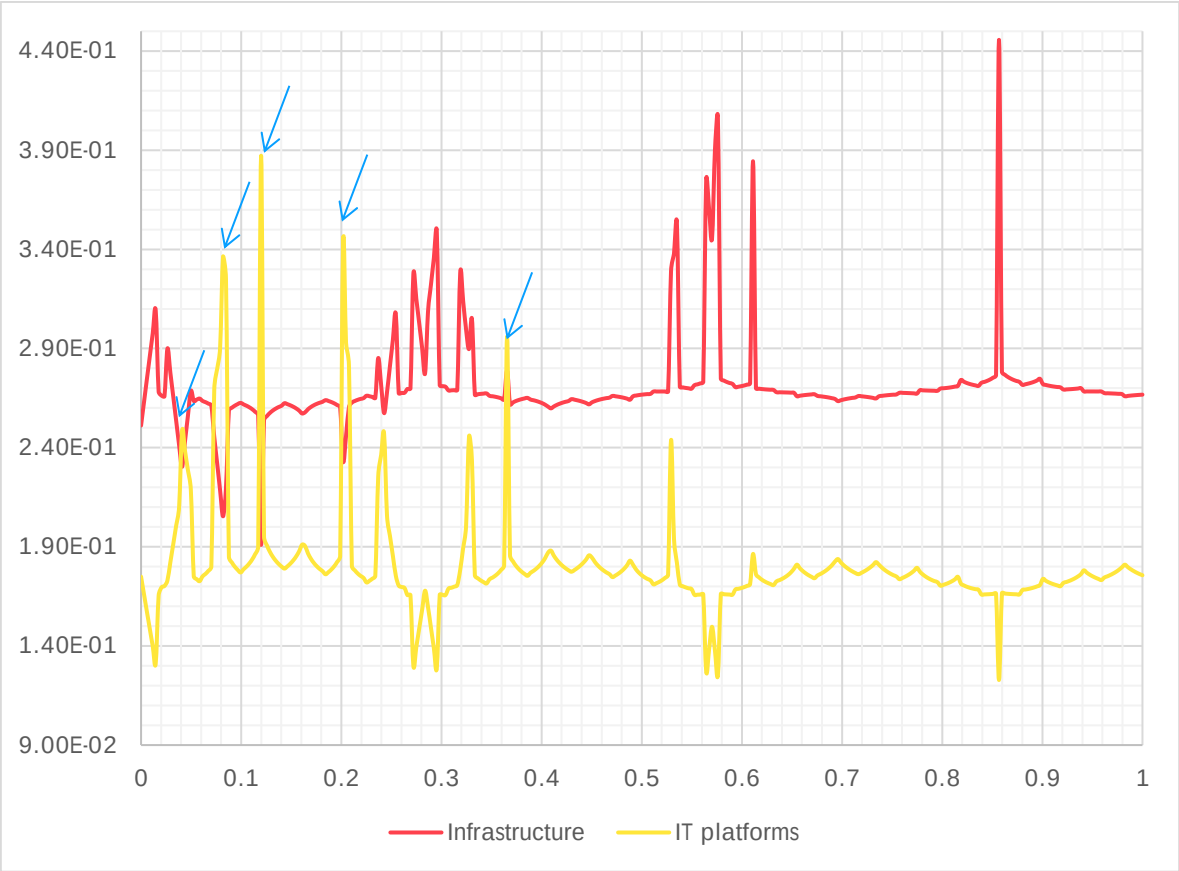

Figure 6: Rank reversals between #1 and #3

Given the importance of those top 3 criteria, the more likely explanation for those swings accounts for the role investment and value plays in type #1 and #3 projects.

Finally in reference to #4 and #5, the analysis shows interchangeability between them at several intervals, which leads to conclude that the ranking is not reliable for those two types of projects, the only possible inference is that they are consistently on the bottom 2.

8.2 Applicability

Leaving behind the results of the analysis itself, in this section a possible way to scale this into the organization will be explored.

The application itself is straightforward as long as the judgements and weights interpret a larger audience, for that process running the judgement and pairwise comparison among a group of key stakeholders will be more than enough, translating said judgments into the tool should follow a straightforward numerical approach.

Once new weights are in place, the evaluation of each project should be made available on the current tool or excel spreadsheet rather than using SuperDecisions, since it is a straight product. The evaluation can be adapted from current PMO artifacts and similar measurement scales as proposed here.

Over several iterations, maybe the reduction of dimensions in the hierarchy could be studied, but in the author's opinion if it were integrated as part of the normal PMO artifacts the scoring piece can be eased.

On a different note, the prioritization proposed at minor scale is sensible, yet it does not account for resource restrictions, e.g., if the top 3 priorities were focused on the same country maybe they have a 'xor[11]' relationship among them which is not accounted here.

As pointed on 8.1, the proposed ranking can be reliable for the top 3 categories, since the purpose of this tool is to quickly rank among all competing projects, this tool could prove its utility.

[11] Exclusive or: this is a logical operation in which is strictly imposed only one A or B, but not both. Is denoted *'A xor B'*

9 Conclusions

The main objective of this study was to propose a method for project prioritization based on the Analytic Hierarchy Process (AHP). It presented the theoretical background by relevant works in the field, as well as its application to a real case study involving the selection of projects in an international organization. It also discussed some challenges and limitations of the method, such as the reduction of dimensions, the sensitivity analysis, and the resource constraints.

This study contributed to the literature on project management by providing a rounded and practical approach for project prioritization that can account for multiple criteria and stakeholder preferences. It also suggested some directions for future research, such as integrating the AHP with other methods, exploring different weighting methods, and extending the method to handle dynamic and interdependent projects.

The paper concluded that the AHP is suitable for project prioritization, it can help decision makers to select the most suitable projects for their strategic objectives and available resources. The paper also highlighted the importance of involving the relevant stakeholders in the prioritization process, as well as conducting a robustness and sensitivity analysis to ensure the validity and reliability of the results.

Finally, as shown on section 8 the criteria and ranking seems to be reliable as consistent, at least for the top 3 types of projects, with the most important criteria be around Strategic Alignment, Business Value and Financial Impact; switching the focus from the expected results of the project rather than the inside look of triple constraint and how to properly manage the project, as suggested by the literature.

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11 Annexes

Project	TOTALS	PRIORITIES	0.037434 Improved product	0.017095 New market opport	0.163945 Reduced costs	0.006824 CLTV / loyalty im	0.016248 Customer Satisfac	0.025792 Improved User Exp	0.017335 Cost-Benefit Anal	0.105433 Investment size	0.042751 Revenue Generation	0.016198 Availability of I	0.007229 Budget Availabili	0.048392 Digital Infrastru	0.003921 Market Risks	0.020553 Regulatory and Co	0.008977 Technical Risks	0.089386 Alignment with GI	0.283783 Alignment with Re	0.03754 Market Trends and	0.004004 Availability of T	0.038395 Complexity of Imp	0.008767 Technology depend
DAP projects	0.427921	0.199047	1	0.080125	0.165525	0.080125	0.188368	0.080125	1	0.095895	0.165525	1	1	0.306142	0.095895	0.346681	1	1	0.346681	1	0.664326	1	0.080125
Digital projects	0.400543	0.186313	0.346681	1	0.165525	1	0.410656	1	1	0.095895	0.165525	1	1	0.064722	0.095895	0.346681	0.346681	1	0.346681	1	0.664326	0.095895	0.080125
Bespoke projects	0.267222	0.124298	0.346681	0.080125	0.095895	0.080125	0.106176	0.080125	0.095895	0.095895	0.095895	0.080125	0.080125	1	0.165525	0.346681	0.080125	0.080125	0.346681	0.346681	0.306142	1	0
Infrastructure	0.639607	0.297513	1	1	0.095895	0.080125	0.410656	1	0.165525	1	0.165525	0.080125	0.346681	1	1	1	0.346681	0.346681	1	0.346681	1	0.165525	0.346681
IT platforms	0.414553	0.192829	0.346681	0.080125	1	0.080125	0.051989	0.080125	0.095895	0.165525	0.095895	0.080125	1	1	0.165525	1	0.080125	1	0.080125	0.346681	0.306142	0.095895	0.080125

Annex 1: Evaluation & rating for each project