TRANSITIONING FROM AN INSTITUTIONALLY DEFINED CANDIDATE SEARCH TO THE ANALYTIC HIERARCHY PROCESS: IMPROVING FACULTY SELECTION

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ABSTRACT

This article presents a comprehensive model using the Analytic Hierarchy Process (AHP) for faculty search and selection at a regional university. After developing and applying evaluation criteria based on generalized position descriptions, the search committee chose to revise the criteria using the AHP. The revision allowed for more detailed and relevant assessments of candidate competencies and experience. While full implementation of the AHP was time-constrained, outcomes revealed greater consensus regarding preferred qualifications and presented a clearly defined rationale to support recommendations. In the decision-making process, the main criteria included degree, teaching, student engagement, research, service, experience, and diversity. Some of the main criteria had associated detailed sub-criteria. Although the AHP is typically used early in the faculty selection process, in this specific scenario, the initial elimination of candidates from the pool was made simpler by clearly defining the required qualifications and then closely evaluating the preferred qualifications. This article aims to assist higher education institutions in prioritizing and ranking their selection criteria, which have been found to be similar across different institutions.

Keywords: AHP; faculty search; human resources; decision-making; multi-criteria decision making

1. Introduction

Selecting the most suitable candidate to fill a tenure-track faculty position is important for higher education institutions. Whether the goal is to attract a new Ph.D. candidate or experienced faculty, such decisions are generally expected to be long-term. The best outcomes are realized as the new colleague contributes to program and institutional objectives in alignment with the mission of the department, college, and university. As academic institutions are committed to shared governance, faculty engagement with students, colleagues, and administration is important in establishing a culture that

supports collaboration and continuous improvement (Taylor et al., 1998; Grandzol, 2005; Moshkovich & Mechitov, 2018; Abuizam & Lucas, 2013).

Faculty search efforts can be complicated. Factors such as the size of the candidate pool (Mamat & Daniel, 2007) and market conditions for prospective candidates (Rouyendegh & Erkan, 2012) can vary and may be revealed only as a search is launched. Context refers to the environment in which a decision takes place. The inclusion of external contextual factors is vital in strategic and public decision-making. For instance, in the public sector, considering the broader context, it is important to involve stakeholders through consultation or participatory decision-making. Public and private sector management differ in their approach to transparency and stakeholder engagement. The public sector places a strong emphasis on these aspects, as the actions of stakeholders play a crucial role in determining the success and acceptance of proposed initiatives (Gonzalez-Urango et al., 2024). As with many group-based decision processes, selection must consider the viewpoints of individual committee members while building consensus and ideally leading to group support for any final recommendation (Liberatore, Nydick & Sanchez, 1992; Liberatore & Nydick, 1997).

For members of a search committee, the commitment of time and energy can be substantial. Once a position is approved and the committee established, members typically participate in applicant recruiting, screening, interviewing, hosting, and final evaluation (Grandzol, 2005; Moshkovich & Mechitov, 2018). Depending on the requests from academic or administrative leadership, committee recommendations may focus on an individual, a ranked order of candidates, or an unranked list of finalists. The intensity of the search can depend on when the search occurs during recruiting cycles. Where searches are generally designed to meet process and compliance requirements outlined by human resources, there is less information on how to apply criteria for candidate review and selection (Grandzol, 2005).

This article describes a faculty search initially guided by a standard institutional process. As the search committee progressed through discussion, definition, and application of evaluation criteria, members expressed dissatisfaction with the level of detail supported in the process framework as well as the approach used to rank criteria. After the preliminary review of applicants was completed, the committee chose to revisit and modify criteria using the Analytic Hierarchy Process (AHP) as a tool to better define criteria, establish criteria weights, evaluate candidates, and present recommendations. Therefore, this article presents an approach that leverages institutional guidelines to define and prioritize candidate selection criteria, resulting in consensus and an improved understanding of recommendations. This study intends to address the question, “How does the application of the AHP improve the selection process for faculty positions in higher education?”

2. Literature review

As a frequently studied multi-criteria decision making (MCDM) process, the AHP finds relevance across industries in cases where both quantitative and qualitative factors are important considerations in decision-making (Ho, 2008; Emrouznejad & Marra, 2017). In higher education, the AHP has been employed in a range of areas, including faculty

evaluation for tenure and promotion, selecting research for award recognition, faculty and administrative recruiting, strategic planning, and other areas (Liberatore & Nydick, 1997; Anis & Islam, 2015).

The application of the AHP in higher education recruiting has been employed to fill faculty (Salomon et al., 2009; Grandzol, 2005), staff (Rouyendegh & Erkan, 2012, 2013), and administrative positions (Gibney & Shang, 2007; Taylor et al., 1998). Studies have considered the AHP as a sole method for evaluation and selection (Soloman et al. 2009; Taylor et al., 1998), in a modified form (Rouyendegh & Erkan, 2012a), and in-comparison-to, as well as in-combination-with other techniques (Mamat & Daniel, 2007; Chen et al., 2015).

Common strengths attributed to AHP implementation include structure and consistency in decision processes (Liberatore & Nydick, 1997), the ease with which users can understand and apply the method (Grandzol, 2005), the ability to document the decision process (Moshkovich & Mechitov, 2018), and its helpfulness in explaining the link between decision goals and outcomes (Moradi, 2022). In higher education, an important benefit of the AHP is its support for consensus-building in decisions (Liberatore et al., 1992).

An acknowledged challenge with the AHP emerges when the number of criteria and/or selection alternatives increases, potentially increasing the time necessary to prepare a comprehensive analysis (Taylor et al., 1998; Mamat & Daniel, 2007). Table 1 documents studies and cases that employ the AHP and related MCDM methods in higher education recruiting and selection decisions.

Researchers have applied the AHP under hypothetical circumstances to illustrate how the process may be used for faculty selection. Abuizam and Lucas (2013) illustrated a two-round process. The first round established criteria priorities, including degree status, teaching experience, research, and work experience, which were used to evaluate and narrow a three-candidate pool to two candidates. Round two used a similar process focused on the candidates to evaluate hypothetical feedback from oral presentations, student evaluations and committee evaluations, leading to a final candidate recommendation.

Jain, Singh, and Bhatti (2018) employed a similar two-round approach to select a tenure-track faculty member at an engineering technology institute. They ranked four selection criteria related to education, teaching experience, research, and industry experience. They initially employed the criteria to four applicants for a hypothesized faculty position at an engineering institute. A second round focused on two finalists based on hypothesized evaluations of oral presentations, student evaluations, and interview panel criteria.

Chen et al. (2015) used the Analytic Network Process (ANP) to incorporate institutional goals as an important factor when evaluating prospective faculty candidates. Their hierarchy considered inter-relationships between each institutional goal (to expand research capability, to enhance the reputation of the institution, to develop new areas and create new courses, to support administration) and candidate selection criteria (educational background and work experience, academic achievement, teaching ability,

and characteristic and personality). By completing a pairwise comparison of each selection criteria across each institutional goal, they established a super-matrix, which was transformed to reveal the weights of each criterion in relation to each goal. Three sub-criteria for each criterion were defined to establish priorities in relation to criteria. Rather than pairwise comparisons of candidates, committee members used a 100-point scale to evaluate each candidate across sub-criteria. The scores were combined with weights, resulting in a suitability index used in candidate selection.

Table 1
MCDM applied to higher education personnel selection

Author(s)	MCDM +Method	Research method	Application scenario	Candidate population	Review rounds	Selection criteria
Moshkovich & Mechitov (2018)	Verbal Decision Analysis	Case study	TT IT faculty	32 from a pool of 48 reduced to 14 – reduced to 5 for interviews	Two: Criteria preference & Candidate assessment	Four level 1 Five level 1
Jain, Singh & Bhatti (2018)	AHP	Example of methodology	TT Engineering faculty	Four hypothetical candidates	Two: Criteria weight & Candidate selection	Four level 1, Three level 1
Chen et al. (2015)	ANP + Markov Chain	Example of methodology	Undefined faculty	Four hypothetical candidates	Three Institutional goals, Criteria weight & Candidate selection	16 level 1 (Institutional Considerations), 12 level 2
Abuizam & Lucas (2013)	AHP	Example of methodology	Undefined faculty	Three hypothetical candidates	Two: Criteria weight & Candidate selection	Four level 1
Behera & Sarkar (2013)	Fuzzy TOPSIS	Case study	Engineering faculty	Five candidates	Two: Linguistic scale & Candidate selection	Eight level 1
Rouyendegh & Erkan (2012a)	Fuzzy AHP	Case study	Undefined academic staff	Five candidates	Two: Criteria weight & Candidate selection	Three level 1, 10 level 2
Rouyendegy & Erkan (2012b)	Fuzzy ELECTRE	Case study	Undefined academic staff	Five candidates	Two: Criteria weight & Candidate selection	Three level 1, 10 level 2
Solomon et al. (2009)	AHP	Case study	Logistics faculty	Six from pool of 20	Two: Criteria weight & Candidate	Four level 1, Six level 2, Four level 3

Author(s)	MCDM +Method	Research method	Application scenario	Candidate population	Review rounds	Selection criteria
					selection	
Mamat & Daniel (2007)	Singular Value Decomposition vs AHP	Simulation	Undefined faculty	Six hypotheticals randomly generated	Two: Criteria weight & Candidate selection	Four level 1
Gibney & Shang (2007)	AHP	Case study	Business Dean	Five candidates post-visit from pool of 30	Two: Criteria weight & Candidate selection	Two level 1, Four level 2, 13 level 3
Grandzol (2005)	AHP	Case study	TT management faculty	Eight from original pool	Two: Criteria weight Candidate selection	Five level 1, Eight level 2, 15 level 3
Taylor et al. (1998)	AHP	Case study	Dean selection	33 in categorized into three groups	Two: Criteria weight, Candidate attribute groups, Group selection	Four level 1

Mamat and Daniels (2007) evaluated process efficiency and effectiveness in faculty selection when considering the number of decision alternatives. They used Monte Carlo simulation to evaluate completion time and rank consistency between singular value decomposition (SVD) and the paired comparison approach employed with the AHP. Varying both the number of selection criteria and the number of candidates being reviewed, their findings from 100 simulations indicated that SVD could reduce the average time of candidate evaluation as compared to the AHP by two-thirds.

Rouyendegh and Erkan (2012) incorporated fuzzy set theory in the AHP process to consider the data uncertainty that can emerge when evaluating priorities in selection criteria. Applied to the selection of academic staff, a group of experts completed pairwise comparisons of decision criteria, which were combined and converted into a fuzzy scale. Criteria considered individual factors (GRE-foreign language, bachelor's degree average and oral presentation); academic factors (academic experience, research paper, technical information, team working); and work factors (self-confidence, compatibility, and age). Applying a linguistic scale to candidate evaluation resulted in a ranked order of finalist candidates.

In a subsequent article, Rouyendegh and Erkan (2013) applied Fuzzy ELECTRE to the staff selection process. Elimination Et Choiz Traduisant la Realite' (translated Elimination and Choice Expressing the Reality) incorporates concordance and discordance indices to analyze alternatives. In this case, expert evaluation and ranking across ten criteria were translated into a normalized decision matrix. Concordance and discordance indices were then calculated for the different criterion weights and used in the final evaluation of candidates.

Rouyendegh and Erkan (2012) compared outcomes between candidate rankings using the fuzzy AHP method and the fuzzy ELECTRE method. The results were very close, and both methods selected the same candidate as first choice. While proof-of-concept studies employ hypothetical or project-related data to introduce and evaluate AHP and alternative methods, case study research has added context related to the implementation and outcomes of applying the AHP for higher education personnel selection in staff, faculty, and administrative positions.

Saloman et al. (2009) presented a case comparing the AHP with standard institutional hiring processes to fill a faculty position in logistics management. Though the application of the AHP did not occur until after hiring was completed, two of the three members of the search committee participated in criteria identification, ranking, and candidate evaluation. The process resulted in the same recommendation; however, the committee identified cases where the original process selectively applied evaluative criteria.

Gibney and Shang (2007) described using the AHP to select a Dean of Business Administration at the University of Pittsburgh. Their process employed traditional ranked reviews to reduce the candidate pool to 7 from 30. After two candidates withdrew, an AHP committee formed to evaluate the remaining five. Selection criteria fell along dimensions of leadership and resources, resulting in a total of 18 attributes. While the committee applied the AHP to rank candidates, they were asked to submit an unranked list to the provost for review. The provost chose the candidate that ranked second based

on committee criteria. In their post-selection sensitivity analysis, the authors suggested the provost may have weighed leadership as being more important to the selection. In addition, the provost may have viewed candidate potential and proven track record equally.

Grandzol (2005) proposed the AHP to create a structured, data-driven process for faculty selection. As described in the case, the search committee adopted the AHP in a separate nine-step selection process to consider both objective and subjective criteria, promote consistency in judgments, reduce time, and document the process strategy. Their three-level hierarchy consisted of five level-one criteria, which included experience, scholarly activities, technological skills, flexibility in teaching capabilities, and experience with diverse populations. Level-two and level-three criteria refined the criteria for teaching, experience, and scholarship. These authors defined key objectives for successfully selecting faculty candidates as follows, "It needs to result in the best candidates. It needs to minimize the consumption of resources. It needs to capture all pertinent preference issues. It needs to be fair and equitable to all participants (faculty and applicants). And finally, it needs to be reusable (which is where real efficiency manifests itself)" (Grandzol, 2005, p. 9).

Taylor et al. (1998) applied the AHP to recruit a College of Business Dean. Primary criteria included AACSB accreditation experience, administrative experience, publication record, and fundraising ability. Challenges emerged early in the process that normally would have required a time-consuming effort to complete paired comparisons among 33 candidates. Rather than paired comparisons, the committee segmented the candidate pool across three groups, each exhibiting shared attributes. Despite the effort to reduce the candidate pool, as the process moved forward, some candidates withdrew their applications. Of those invited for campus interviews, one was offered the position, though he did not accept.

Considering what they viewed as the "imprecise judgment of decision makers" (Behera & Sarker, 2013, p.743), this study employed a fuzzy TOPSIS (Technique for Order Preference by Similarities to Ideal Solution) approach to the selection among five engineering faculty candidates. An expert committee identified eight criteria for selection, which were subsequently transformed into a questionnaire for the candidates. Committee members also provided input to create triangular fuzzy numbers for each of the five linguistic scales used for evaluation. The combination of criteria and scale development combined to establish a normalized fuzzy decision matrix across candidates and criteria. Calculating the distance between positive and negative ideal solutions resulted in a ranked order for candidate selection.

Table 1 clearly differentiates between studies employing hypothetical scenarios and those utilizing real-world applications, highlighting the unique contribution of this study. By addressing the dearth of real-world case studies, this research not only advances the theoretical understanding of the AHP but also offers practical insights for its implementation in real-world decision-making processes.

Our thorough examination of the literature revealed a few significant findings. First, it revealed that institutions typically share comparable selection criteria focused on teaching

experience, scholarly activities, and work experience, which supports the significance of our study. This implies that the proposed model can be universally applied in higher education institutions to assist in the faculty recruitment process. Moreover, there are only a small number of research articles that specifically discuss the application of the AHP and other MCDM methods in the context of faculty selection. Currently, the most commonly used MCDM methods include the ANP, AHP, Fuzzy AHP, and TOPSIS. Additionally, the majority of articles that previously utilized the AHP employed hypothetical scenarios and lacked real-world applications. It is evident that a significant gap exists in the utilization of real-world case studies. While some studies have explored the AHP, many have relied on hypothetical scenarios, limiting the practical applicability of their findings. This article aims to address this gap in the current literature. Specifically, it builds on previous studies by demonstrating the practical application of the AHP in the context of faculty selection, thereby diverging from the theoretical focus of earlier research. The level of detail in the case study also surpasses previous studies that did include real-world scenarios. This study stands out from earlier applications of the AHP in faculty selection by introducing a very comprehensive model.

This study also offers valuable practical implications for higher education institutions. It illustrates how higher education institutions can draw from and enhance existing faculty selection processes by implementing the proposed AHP model, resulting in more structured and objective decision-making. This can ultimately lead to improved academic outcomes and more effective hiring choices. The findings of this study indicate that the AHP can be an effective tool for addressing the complexities and challenges involved in faculty selection, thus making a valuable contribution to the broader field of academic administration.

3. Analytic Hierarchy Process (AHP)

The AHP is a versatile and scalable decision-making method that enables direct involvement in complex decisions and prioritization processes by numerous stakeholders from diverse backgrounds and experiences (Ray et al., 2024). The AHP is a measurement theory that uses pairwise comparisons and expert judgments to establish priority scales (Saaty, 2001). It breaks down a problem and subsequently aggregates the subproblems' solutions, leading to a recommendation. It facilitates decision-making by organizing perceptions, feelings, judgments, and memories into a framework that exhibits the forces influencing a decision.

Using the AHP to model a problem, a hierarchic structure breaks down the problem into individual criteria, and pairwise comparisons are used to establish relationships within the structure. Figure 1 illustrates the decision-making process with the AHP.

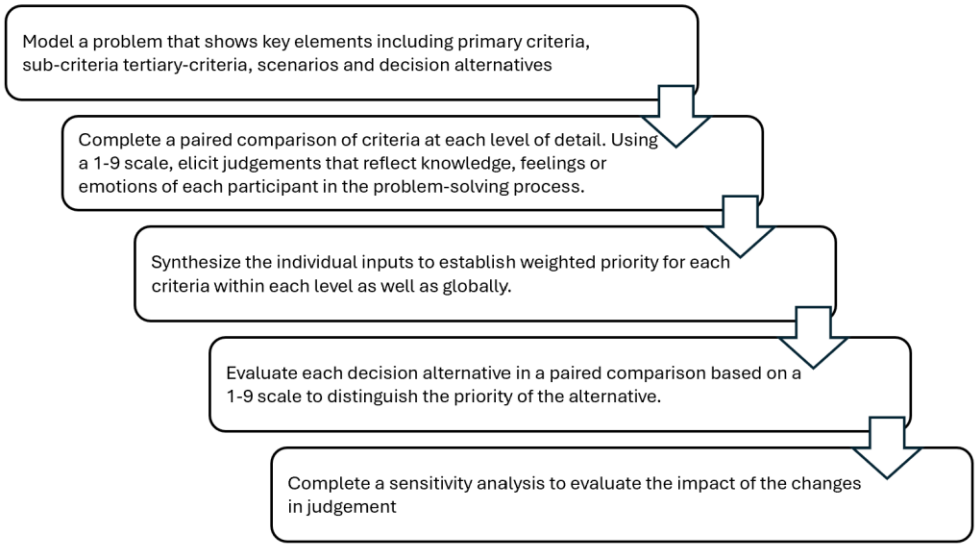

Figure 1 Decision-making process with the AHP

The process starts by structuring a decision-making problem as a hierarchy. The model includes the problem's key variables as well as decision alternatives. Next, the decision alternatives are prioritized by having decision-makers, (typically working individually) assign numerical values to represent subjective judgments comparing the relative importance of each variable. The approach then synthesizes the judgments to determine which variables have the highest priority.

According to Saaty, "the fundamental scale of the AHP is a scale of absolute numbers used to answer the basic question in all pairwise comparisons: how many times more dominant is one element than the other with respect to a certain criterion or attribute?" (Saaty 2004, p.8). Saaty (2010) argues that "AHP is the thinking man's rational way to combine logic to identify connection among attributes and judgments to derive priorities from causal explanation. Its questions revolve around what dominates what on the average or on the whole and how strongly it is expressed verbally and translated numerically with the use of the absolute fundamental scale." (p. xiii) Each paired comparison uses a 1-9 point scale that allows the decision-maker to express their preference between each pair of attributes. They can view the attributes as equally important or distinguish one or the other attribute as moderately more important, strongly more important, very strongly more important, and extremely more important.

The descriptive preferences are then translated into numerical values of 1, 3, 5, 7, and 9, respectively, with 2, 4, 6, and 8 as intermediate values for comparisons between two successive qualitative judgments. Reciprocals of the values are used to describe corresponding transposed judgments. As a result, priorities are derived for the criteria in terms of their importance to achieving the goal. When conducting pairwise comparisons, the consistency ratio (CR) is employed to assess the inconsistency of the judgments. A ratio equal to or less than 0.10 serves as a reliable indicator of informed judgment (Saaty, 1980). The measure of inconsistency can be used to improve the consistency of judgements. Therefore, even if the judgments were inconsistent, there is still an opportunity for fine-tuning.

In a similar manner, the alternative solutions are compared with respect to each criterion or sub-criterion to determine an overall outcome. A sensitivity analysis can subsequently be done to test the responsiveness or sensitivity of the outcome of a decision to changes in the priorities of the criteria of that problem.

4. Case study: Faculty search and selection

4.1 Background

A variety of factors can prompt the need for a faculty search. In this particular case, in early fall an associate professor of supply chain management announced they would be leaving at the end of the spring session. As a specialization in the College of Business, the supply chain management program maintains high enrollment and is available to students in a classroom environment at the university's main campus and two regional centers, as well as via hybrid and fully online options. The supply chain faculty included six tenured/tenure track faculty, a non-tenure track lecturer, and select quarterly adjuncts.

Following steps outlined in the recruitment and hiring checklist provided by the university's human resource (HR) department, a hiring request was presented to the College of Business Dean and the Provost. In January, the Provost approved a faculty replacement at the rank of assistant or associate professor. As the departing faculty member was located at the main campus, the position would also be located at the main campus. The Dean and Department Chair selected three tenured supply chain faculty to conduct the search.

Much like processes outlined by Grandzol (2005) and Moshkovich and Mechitov (2018), the recruiting and hiring checklist presented by the department of human resources detailed steps and responsibilities across seven stages, including:

1. Initiating the hiring process
2. Posting the job
3. Developing screening criteria
4. Screening applicants
5. Interviewing
6. Offering the position
7. Post-search follow-up

Before posting the position, the committee met and reviewed the interests and expertise of the current faculty. They also discussed changes to the program curriculum, which were either recently implemented or planned for the coming academic year. The review identified potential gaps in content expertise and experience to consider in the search. The resulting criteria summary was documented in a position announcement, separated into required and preferred qualifications (Figure 2). "Required qualifications" reflected subject expertise, evidence of research potential, and evidence of teaching excellence. They served to establish a discordance level to identify minimally qualified candidates from the initial pool of applicants (Grandzol, 2005). "Preferred qualifications" included experience teaching specific topics previously taught by the departing faculty, as well as new courses, non-academic employment experience, evidence of industry outreach,

evidence of student engagement, and experience with alternative modes of course delivery. These revealed additional criteria that could impact the selection of the finalist candidates and the resulting hiring recommendations.

Required Qualifications
• Doctorate in Supply Chain Management, Operations Management, Logistics, or related field from an AACSB accredited institution. Candidates who are ABD and nearing completion of their dissertation may be considered, however the terminal degree must be completed within one year of start date. • Academically-qualified for purpose of AACSB accreditation. • Experience teaching supply chain courses. • Evidence of teaching excellence through reviews and evaluations. • Evidence of an established or potential record for research in peer-reviewed journals as indicated by proceedings, working papers, submissions and publications. • Consideration for a position as an Associate Professor requires successful track-record of teaching, research and service extending over multiple years.
Preferred Qualifications
In addition to the position requirements, the ideal candidate would have: • Experience teaching specific courses in supply chain management, purchasing, logistics, lean six sigma and/or supply chain modeling and analytics. • Experience incorporating industry-based systems including SAP as part of course delivery. • Prior industry experience. • A record illustrating student support through organization advising, extra-curricular activities and competitions. • Experience with teaching via interactive television, online/internet offerings, blended delivery. • Evidence of teaching courses incorporating industry engagement and projects.

Figure 2 Required and preferred qualifications in the job description

As the position description was posted to job boards and relevant discussion threads, the committee reviewed and modified a candidate screening tool provided by human resources. The resulting tool identified required and preferred criteria, indicated rating dimensions and presented rating values (Figure 3). Multipliers were incorporated to reflect comparative importance among general criteria and allowed for the development of a total point rating for each candidate.

When the screening date was reached, each committee member reviewed and evaluated all applicant portfolios, first to remove applicants that did not meet the required criteria and then to assess the remaining candidates based on their fit with the preferred criteria. Once individual assessments were complete, the committee met to compare candidate scores. Evaluation discrepancies were discussed among the committee members, leading to eventual candidate disposition. The review and ranking process helped identify a subgroup of candidates to invite for the next stage of video conference interviews.

Rating Scale:	Nonresponsive 0	Minimum 1	Weak 2	Adequate 3	Strong 4	Superior 5

RATING DIMENSIONS	Met Req	Points Alloc	Multi-plier	Total Points
Application Materials:	Y/N			
All application materials received AND complete				
Preliminary Screening/Required Qualifications:	Y/N			
Earned doctoral or terminal degree in the field of Supply Chain Management or related disciplines (ABD candidates may be considered; however, the terminal degree must be completed within one year of start date.)	Y/N	1 – Other 3 – MgtSci/IE 5 – SCM/LOG/OPS	PhD = 5 ABD = 4	
Academically-qualified for purpose of AACSB accreditation	Y/N	0 – No 3 – ABD/3yr or older pubs 5 – new Phd or Current Pubs	x2	
Demonstrated teaching across multiple modalities (live, online, hybrid)	Y/N	3 Classroom 4 online 5 multiple	X3	
Demonstrated excellence (reviews, etc) or potential for excellence in teaching. (based on SEOI reviews)		2 = <3.5/5 4 = 3.5-4.25 5 = >4.25	X5	
Established or potential record for research in peer-reviewed journals	Y/N	0 – no record 1 – work papers 3 – proceedings 4 – journal 5-multi journal	X3	
Experience and demonstrated commitment to diversity as indicated on CV or Letter.	Y/N	0-5	X3	
* **If <NO> to any of the Required Qualifications, the applicant does not move forward to secondary screening**				
Preferred Education, Training and/or Skills:		(0-5)	(0-5)	(0-25)
SCM course experience (intro, purch, ops, log, model, analytics, strategy, systems (enterprise)		1 per each relevant course up to six	X5	
Work experience with focus on supply chain related positions.		0 – 0 yrs 1 <1yr 3 <3yr 5- >3yr	X4	
Industry engagement (associations, consulting, course projects, executive education, etc)		1 per relevant connection type up to 5	X4	
Experience working with student initiatives (clubs, case competitions, external activities, etc)		1 per relevant connection type up to 5	X5	
Experience working with a diverse student population as indicated in letter or CV		0-5	X3	
TOTAL POINTS (225 possible)				

Figure 3 Candidate evaluation sheet

4.2 Criteria identification

After completing initial candidate scoring and comparison, the committee discussed whether the approach accurately reflected a consensus in hiring priorities, particularly regarding the impact of point allocation and point multipliers. The issue involved the method of quantifying candidate fit. While the existing tool appeared effective in separating candidates across general criteria, it was less effective in pinpointing criteria weights that represented key experiences, competencies, and attitudes important to the final selection.

For example, one important factor when evaluating candidates for further review involved their ability to teach courses previously taught by the departing faculty member as well as courses recently added to the program curriculum. As illustrated in the evaluation sheet, SCM course experience was assessed based on the number of different courses where candidates indicated teaching experience (Figure 3). It did not offer a

means to recognize the importance of each candidate's ability to fill course gaps, such as those in purchasing and lean management. Similarly, industry engagement was assessed based on the number of connections without consideration of the relative value of different types of engagement.

Two committee members who are familiar with the AHP proposed revisiting the criteria using the methodology. The AHP was introduced to another committee member who had some knowledge of it. As the search needed to move forward, the committee continued using the existing evaluation approach to screen initial candidates and identify a subset to invite for online interviews.

The application of the AHP started by defining the decision goal, 'Selecting the most qualified candidate to join the supply chain faculty'. The pool candidate score sheet served as the starting point for a more detailed review and discussion of selection criteria. Important factors that serve as level-one criteria in the AHP framework include degree, teaching, student engagement, research, service, experience, and diversity. Table 2 presents primary and sub-criteria, including definitions.

Table 2
Primary criteria and sub-criteria

Primary criteria	**Definitions**	**Sub-criteria**	**Tertiary sub-criteria**
Degree	Attributes related to candidate educational preparation. Degree status, including "All but Dissertation" for a period of time. The relevancy of their major, Supply Chain Management vs. other fields of study. Reputation and accreditation of the school where they received their Ph.D. Notes: ABD (All but dissertation) LT-less than SCM-Supply Chain Management, LOG-Logistics, OPS-Operations, MGTSCI-Management Science, ENG-Engineering	Degree status	ABD LT 5 MO ABD LT 1 YR Ph.D. LT 2 YR Ph.D.
		Major	Supply Chain Management Logistics, Operations MGT Science Engineering Other
		School	AACSB Accredited Institutions preferred
Teaching	Attributes related to candidate teaching competencies and performance. Performance as reflected by: SEOI scores, student comments, teaching awards that the candidates may have received)	Evaluations	Student Evaluations of Instruction (SEOI) scores Student comments Awards

Primary criteria	Definitions	Sub-criteria	Tertiary sub-criteria
	Experience with alternative teaching methods, including in-class, online, hybrid, project-based. Experience teaching courses relevant to the program including Introduction to Supply Chain Management, Purchasing, Operations, Logistics, Global Supply Chain Management, Supply Chain Strategy, Lean Six Sigma, Enterprise Resource Planning, Supply Chain Analytics, Supply Chain Modeling. Experience teaching at different student populations including undergrad, graduate, or executive education.	Methods	In-class Online Hybrid Project-based
		Topics	Intro to SCM Purchasing Operations Logistics Global Strategy Lean ERP Analytics Modeling
		Level	Undergrad Grad Executive
Student engagement	Criteria concerned with candidate dedication and involvement with students, such as student clubs, case competitions, curricular and extra-curricular projects, and the candidates' past involvement in supporting students in career recruiting.		Clubs Case Competitions Projects Recruiting
Research	The candidates' research portfolio, which includes journal papers, proceedings, presentations, forthcomings, any in-review submissions, and working papers to evaluate their scholarship performance.		Publications Proceedings Forthcomings In review Working papers
Service	Service activities directed toward supporting students and service at the department, college, university, or professional levels,		Student Department College University Professional
Experience	The candidates' relevant experience extends beyond educational institutions to industry employment, consulting, teaching, and research, which may involve external stakeholders.		Industry Consulting Research-based Teaching-based
Diversity	Candidates' recognition or support of diversity-focused initiatives.		Recognition Support

The hierarchy descended from the primary criteria to sub-criteria and then tertiary sub-criteria. Figure 4 illustrates the comprehensive hierarchy developed for candidate review and selection.

Whereas the original approach grouped criteria and assigned values based on the groupings (for example, grouping the degree fields into SCM/LOG/OPS, Mgt Sci/Eng, and Other), the AHP approach specified options across individual fields of study. This allowed committee members to prioritize what they believed were more important areas for educational background. The distinctions could be important for both teaching and research contributions in the department.

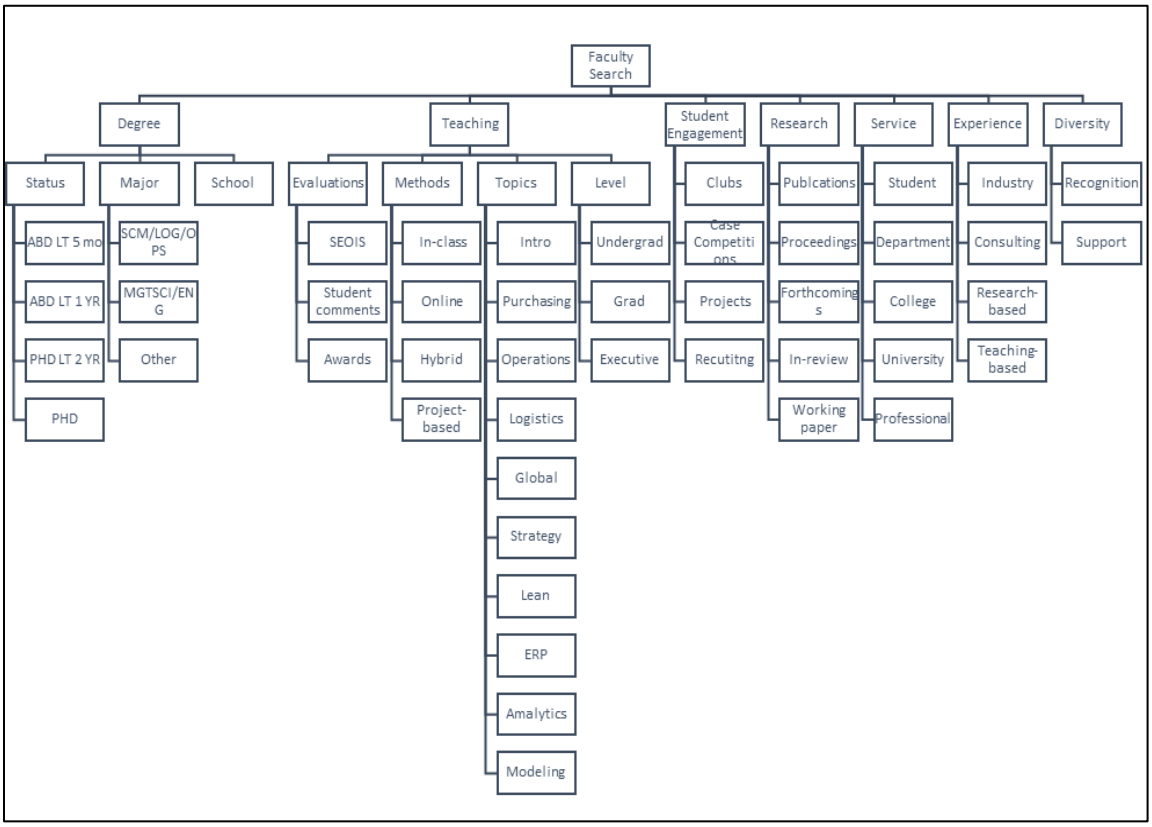

Figure 4 AHP model

4.3 Pairwise comparisons

Once the hierarchy was completed, committee members used an online AHP system, Business Performance Management Singapore (BPMSG,) to collect individual input, evaluating the relative importance of criteria and sub-criteria with respect to the parent element in the adjacent level (BPMSG, 2024). The resulting pairwise comparison matrices were calculated to determine criteria and sub-criteria weights. “Which primary criteria was more important?” was a question repeated 21 times to evaluate every possible pairing between the seven criteria of “Degree,” “Teaching,” “Student engagement,” “Research,” “Service,” “Experience,” and “Diversity,” when choosing a

candidate to fill the open faculty position. The process was repeated in all the matrices by asking the same importance question.

The results confirmed that all committee members agreed that teaching was the most important factor as it was ranked first amongst level-one criteria, with a 28.3% priority (Figure 5). Teaching was followed in order of priority by degree, student engagement, experience, research, service, and diversity. This was not a surprising outcome. Though the main selection criteria are common across higher education institutions, as noted previously, this institution mainly serves an undergraduate population, and the perceptions and judgments of search committee members likely reflect the higher relative importance associated with teaching and student development. Following individual input, the respective judgements were aggregated to construct the group choice. The group composite outcome was calculated by taking the geometric mean of the composite outcome determined by each faculty member's judgments (Table 3).

Throughout the criteria evaluation process, the consistency ratio (CR) of each consolidated decision matrix was reviewed. To be viewed as a consistent assessment across evaluators, the CR should be equal to or less than the threshold value of 0.1 (Saaty, 1980). Across all evaluations, in this case, the consistency ratios were all under 0.1.

Table 3
Consolidated decision matrix for primary criteria

	Degree	Teaching	Engagement	Research	Service	Experience	Diversity
Degree	1	0.79	0.91	1.14	3.30	1.14	4.72
Teaching	1.26	1	3.11	2.15	3.78	1.82	5.28
Engagement	1.10	0.32	1	1.44	2.15	1.82	3.91
Research	0.87	0.46	0.69	1	1.82	1	2.71
Service	0.30	0.26	0.46	0.55	1	0.46	2.47
Experience	0.87	0.55	0.55	1	2.15	1	3.42
Diversity	0.21	0.19	0.26	0.37	0.41	0.29	1
CR= 0.018							

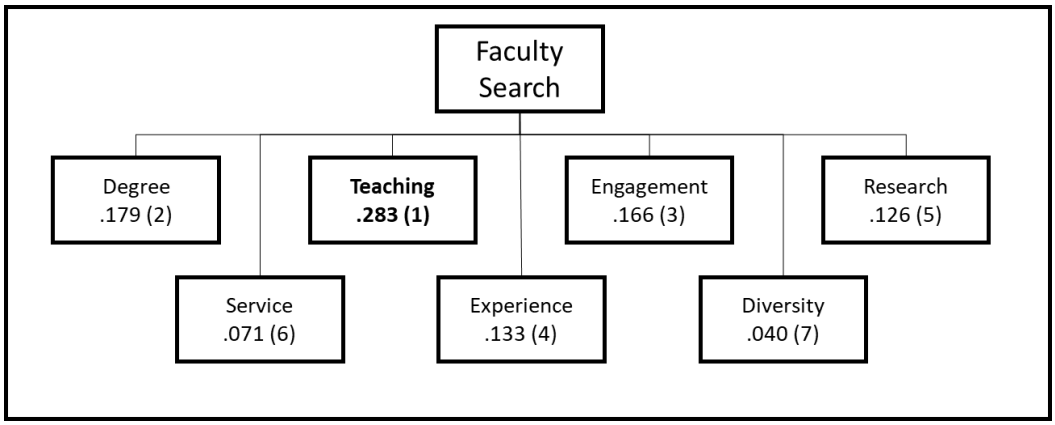

Figure 5 Consolidated weights of primary criteria

As an example of second and third-level criteria priorities, the following figures and tables focus on the teaching sub-criteria. Figure 6 shows results from pairwise comparison matrices reflecting a balanced weighting across level-two sub-criteria associated with teaching. Topics the candidates previously taught came out as the top choice, with a priority of 28.3%. This reflected the committee's desire for a candidate who could teach various topics in the SCM concentration with some emphasis on select topics. The priority associated with introduction to supply chain management is consistent with a general policy that all faculty have an opportunity to teach that course. The second priority, purchasing, addressed a course previously assigned to the departing faculty member.

The teaching methods sub-criterion placed a significant priority on in-class teaching, which is the most likely method to assign faculty located at a main university campus where schedules emphasize an in-person modality.

Evaluations ranked third in priority and sub-criteria were nearly evenly split between student SEOI evaluations and comments, followed by teaching awards. All candidates were asked to present a statement on teaching philosophy and those with prior experience, either as current faculty or Ph.D. candidates generally included student evaluation results as part of their CVs.

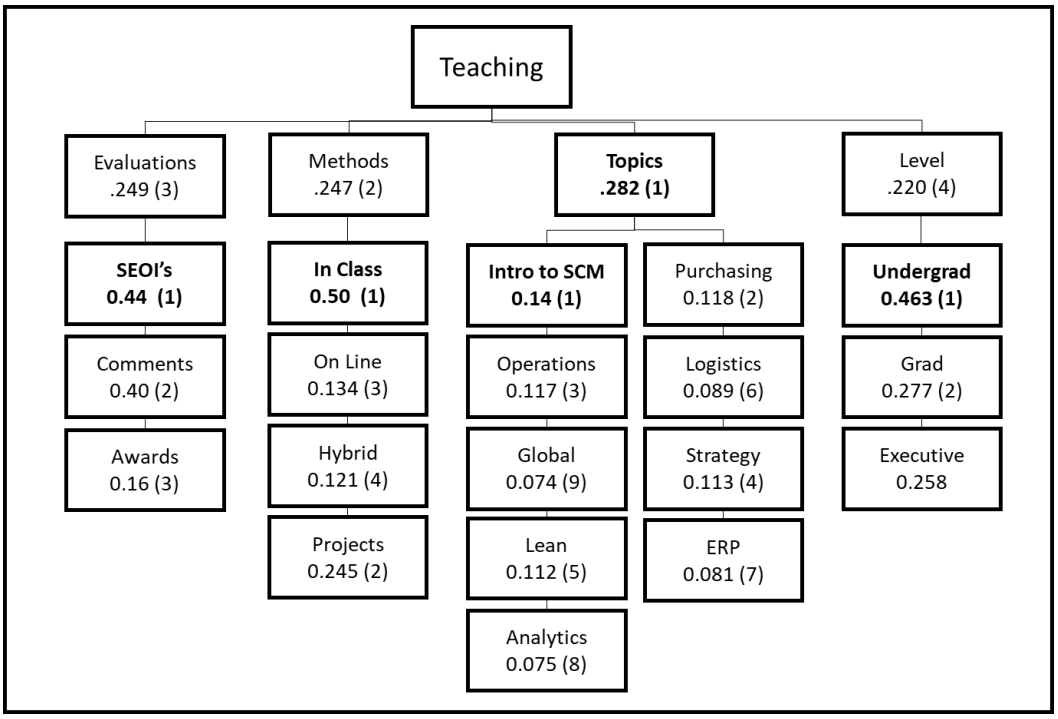

Figure 6 Teaching sub-criteria and values

Table 4
Consolidated decision matrix for teaching sub-criteria

	Evaluations	**Methods**	**Topics**	**Level**
Evaluations	1	1.14	1	0.87
Methods	0.98	1	1	1.14
Topics	1	1	1	1.65
Level	1.14	0.87	0.61	1
CR= 0.017				

After completing all pairwise comparisons, local priorities describing the relative priorities in relation to their parent criterion are derived. Then, global priorities of all criteria that show each criterion's importance in the hierarchy's overall context are

derived from multiplication by the priority of the criterion. Table 5 reveals global priorities for this search.

Table 5
Global priorities

Criteria	**Global priorities**	**Criteria**	**Global priorities**
School	0.048526	In-class	0.035013
ABD LT 5MO	0.006309	Online	0.009358
ABD LT 1YR	0.019696	Hybrid	0.008469
Ph.D. LT 2YR	0.025216	Project-based	0.017168
Ph.D.	0.011596	Intro to SCM	0.011439
SCM/LOG/OPS	0.045139	Purchasing	0.009518
MGTSCI/ENG	0.014573	Operations	0.00941
Other	0.007767	Logistics	0.007129
SEOI Scores	0.030712	Global	0.005956
Student Comments	0.028232	Strategy	0.009121
Awards	0.011582	Lean	0.008955
ERP	0.006501	Working Paper	0.005772
Analytics	0.006003	Student	0.01284
Modeling	0.006003	Department	0.017458
Undergrad	0.029001	College	0.017247
Grad	0.017362	University	0.017207
Exec	0.016148	Professional	0.00643
Clubs	0.028944	Industry	0.043104
Case Competitions	0.018151	Consulting	0.034389
Projects	0.093391	Research-based	0.02436
Recruiting	0.026153	Teaching-based	0.031786
Publications	0.056082	Recognition	0.023875

Criteria	**Global priorities**	**Criteria**	**Global priorities**
Proceedings	0.008625	Support	0.016554
Forthcomings	0.039817	In Review	0.015913

Considering the budget and time limitations during the search, it was necessary to move ahead promptly. As a result, the application of AHP-based criteria prioritization in candidate reviews was limited, but the committee's decision of finalist candidates was validated through the re-evaluation of selection criteria. Three candidates received invitations to visit the University to meet with students, faculty, and administration. Candidates were invited to teach a class, after which students provided feedback on candidate engagement and potential for contribution. Post-visit, and after receiving feedback from prospective colleagues, the committee forwarded a review of candidates and recommendations to the College Dean. In our assessment of all criteria, it was evident that two candidates did not meet the required standards. Unfortunately, their performance was not up to par. An offer was extended to and accepted by the top candidate.

Our new colleague exhibits characteristics that aligned with the AHP criteria priorities. His teaching interests and experience spanned the top three priorities in teaching topics and filled a potential gap in delivering courses in lean management. With two years of post-Ph.D. teaching experience, his student evaluations were high by program standards and student comments confirmed his potential for teaching and engagement. He received the highest scores from students attending the guest lecture during the on-campus visit. He had been involved in outreach to professional communities to coordinate industry tours, host guest speakers, and coordinate a supply chain executive speech series. His industry experience included positions in the military and in consulting. He maintained a substantial research portfolio, including publications, works in process and conference proceedings. Each of these outcomes attests to the validity of our AHP model's results.

5. Discussion and conclusion

This article introduces a comprehensive AHP model that higher education institutions can employ to prioritize and rank their faculty selection criteria, which have been found to be consistent across institutions. While the importance of criteria and the preference for alternatives may vary for each institution, any higher education institute can adopt the proposed framework. Our faculty search started with a ranked order evaluation and adopted the AHP later in the process. The driver of change in this case came when committee members identified potential deficiencies in detailing and prioritizing evaluation criteria. They determined that the use of the AHP to modify the way criteria were prioritized could be beneficial to the process.

The greatest value in changing the approach included reconsidering and establishing what represented an a priori evaluation of criteria that documented relationships and priorities. The method allows for decision input based on subjective as well as objective assessments. Perhaps most beneficial, the AHP presentation of consistency ratios

confirmed shared views of criteria priorities. While it is usually recommended to utilize the AHP at the beginning of the faculty selection process, in this case, the early elimination of candidates from the pool was facilitated by establishing well-defined required qualifications and subsequently conducting a more thorough assessment of preferred qualifications.

The findings of this study can be applied to other institutions or different contexts within higher education, showcasing the flexibility and adaptability of the AHP model. While the specific criteria and their relative importance may differ from one institution to another, the AHP model provides a structured approach that ensures a systematic and transparent evaluation process. This ensures that all relevant factors are considered and appropriately weighted, leading to more informed and objective decision-making. Implementing this framework can help other universities improve their faculty selection processes, overcome any shortcomings in their current methods, and ultimately enhance the caliber of their faculty. The success of this model in one context suggests its potential applicability and benefits across a wide range of educational settings.

Regarding the study's limitations, the time-consuming nature of making pairwise comparisons was a challenge due to the extensive scope of the model. Additionally, the budget and time limitations in the search made it necessary to move forward promptly. As a result, we were unable to use the AHP to compare the final candidates.

Future research would benefit from considering situational factors that can influence decision criteria and priorities in the faculty selection process. Liberatore, Nydick, and Sanchez (1992) and later Liberatore and Nydick (1997) noted an advantage of adopting the AHP to evaluate research for award recognition. Adopting the same AHP model each year helped create a more efficient and trusted process. Faculty selection, while somewhat consistent in process, can experience significant changes in criteria and priorities based on the department or area leading the search, the membership of the committee, search strategies, politics, and other factors. It can also be influenced by external factors related to pool characteristics, competition, etc. Additionally, our future studies will involve the use of a rating model, wherein we will evaluate each candidate separately. This way, with the emergence of new candidates, they can be promptly assessed without influencing the scores of the preceding ones. Once the interviews are finished and each candidate is scored, we can compare them by developing a new model that only considers the top three (or up to five) alternatives. Directly pairwise comparing alternatives yields more fine-tuned and reliable overall priorities before making the final selection, as opposed to simply rating them.

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