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Chef Competencies in the Hospitality Industry: A Structured Systematic Review

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Abstract

This structured systematic literature review examines the publication trends, theoretical, contextual, and methodological gaps in chef competence literature. The review follows a systematic methodology, revealing fragmented research on chef competencies, mainly focused on North America and Asia, with limited global representation. Three dominant theoretical frameworks, Katz's (1955), Sandwith's (1993) and Tas's (1988, 1996), form the basis of chef competency research. The review finds that while technical skills remain core, there is increasing focus on leadership, innovation, and sustainability. It also identifies key theoretical, contextual, and methodological gaps, recommending future research on standardised competency assessment and the integration of emerging technologies across chef competency levels. The study provides valuable insight for hospitality educators, industry practitioners, and policymakers in refining training programs and ensuring culinary professionals are equipped to meet evolving industry challenges

Keywords: Chef competencies; structured systematic literature review; culinary education; culinary skills; theoretical frameworks; competency models

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Introduction

The culinary industry is an evolving and highly competitive discipline that demands a unique combination of technical expertise, managerial skills, creativity, and adaptability (Chabongwa et al., 2024). Thus, effective management of gastronomy plays a crucial role in enhancing the tourist experience and encouraging positive word-of-mouth advocacy (Darwis et al., 2024, Jonson & Masa, 2023). With the increasing globalisation of cuisine and rapid advancements in food technology, the role of chefs has expanded beyond traditional kitchen duties to encompass leadership, sustainability, and innovation (Giampiccoli et al., 2024; Gersh, 2016). The culinary industry is expected to grow by 25% from 2022 to 2032, driven by the expansion of the restaurant sector and rising consumer demand for quality dining. As a result, chefs have career opportunities ranging from entry-level to advanced roles, with potential for specialisation (Sandeep, 2024). In this context, competency models/frameworks for chefs have become a critical focus in both academia and industry, guiding the development of skills necessary for culinary professional success (Suhairom et al., 2019). However, existing research presents multiple frameworks with varying perspectives on what constitutes essential chef competencies, leading to a fragmented understanding of the field.

Several theoretical models have been used to conceptualise chef competencies. Katz's (1955) skills model categorises competencies into technical, human, and conceptual domains, providing a foundational perspective. Sandwith (1993) expands this into a competency model that distinguishes between job-related and managerial competencies. Tas (1998) further refines the discussion by identifying essential skills specifically for hospitality professionals. While these models have been widely referenced, there is limited research comparing their relevance and application in contemporary culinary contexts. Although systematic literature reviews [SLRs] have been conducted on chef competence, they have limitations. For example, Vogel et al. (2021) rely on a single database (EBSCO platform), excluding studies from other major databases (Web of Science and Scopus), which may limit comprehensiveness. Similarly, Vogel et al. (2024) base their bibliometric study on 17 publications, which is a relatively small dataset for bibliometric studies. While bibliometric techniques, such as co-word and citation analysis, provide insights into research trends, they do not critically assess the theoretical, contextual, and methodological approaches used in chef competency literature. Therefore, considering the above limitations of existing SLR on chef competence, our study addresses the following research questions.

RQ1: What are the publication trends in chef competency research?
RQ2: What are the dominant theoretical frameworks used in chef competency research and how have they evolved over time?
RQ3: What research contexts and methodologies have been adopted by researchers?
RQ4: What are the future research directions in chef competency research?

The study integrates structured SLR recommended by Paul et al. (2023) to provide a transparent and replicable synthesis of existing literature. The review will guide researchers, practitioners, and policymakers by identifying key gaps in chef competency research and supporting the development of more comprehensive, future-ready frameworks.

Review protocol

Review protocol is an essential component of SLRs. It ensures careful planning, consistency in implementation, and transparency, enabling replication (Paul et al., 2021). While there exist a few protocols, such as Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA), allowing researchers to report their reviews in an orderly, rigorous, and transparent manner, they are meant for general systematic reviews and provide little rationale that researchers can use to justify their review decisions (Ibid). Therefore, to address this gap, Paul (2021) developed the Scientific Procedure and Rationale for Systematic Literature Review (SPAR-4-SLR) protocol, consisting of three stages and six sub-stages, as represented in Figure 1.

Stage 1: Assembling comprised of two sub-stages identification and acquisition.

Identification is based on four criteria: Domain, research questions, source type, and source quality. A domain can be an area, outlet, or topic that is central to the study. In this SLR, chef competence is the domain. Well-defined research questions guide the discovery of themes, characteristics, constructs, and relationships in the domain. Accordingly, this study addresses three research questions (refer to Figure 1) (Paul et al., 2021). The third criterion of the identification sub-stage is defining the inclusion and exclusion of sources of published documents. This SLR includes articles published in journals as they contribute to scholarly advancement and undergo rigorous peer review (Ibid). The fourth criterion is defining the source quality. Only articles indexed in Scopus and WoS are included because they transcend disciplines.

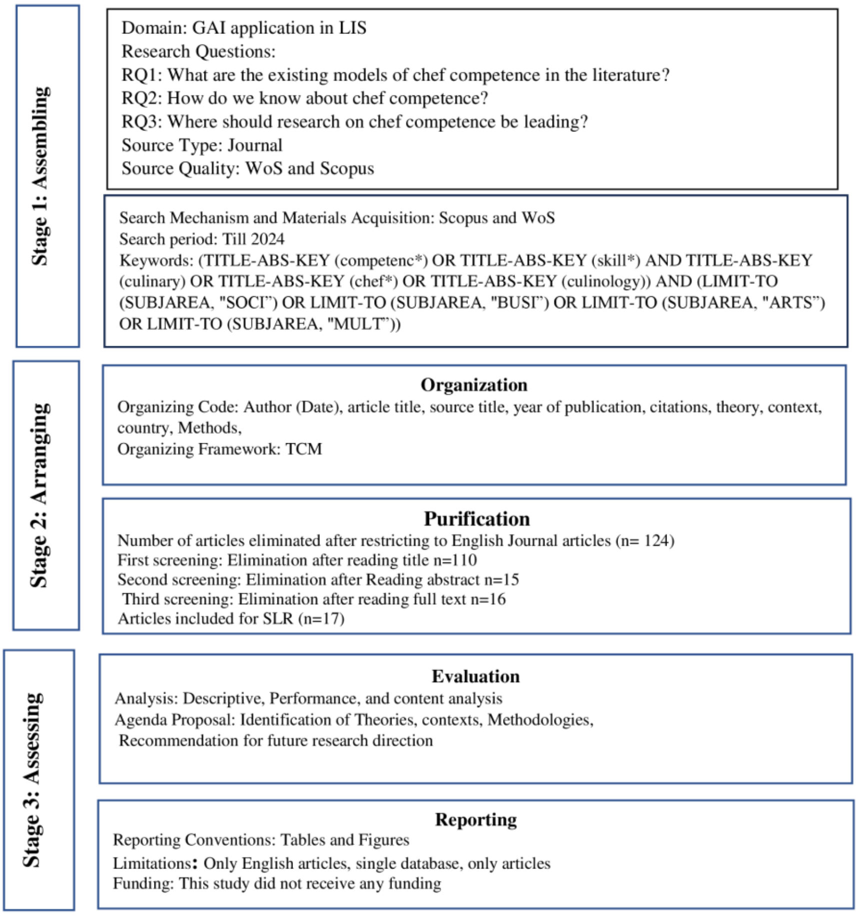

Figure 1: The SPAR-4-SLR framework

Acquisition is the second sub-stage of assembling, comprising three criteria: Search mechanism and material acquisition, search period, and search keywords. This review retrieved the articles from two databases, Scopus and WoS. The search period was kept open due to the limited and emerging nature of research on chef competence. The search string in this SLR uses broad keywords like "competence" and "skill" to capture multidisciplinary research on chef competencies, covering various aspects of expertise, capabilities, and proficiency. The inclusion of search keywords "culinary," "chef," and "culinology" refines the search to the specific domain of culinary arts and food science. To ensure an interdisciplinary approach, the search was limited to subject areas, such as Social Sciences, Business, Management and Accounting, Arts and Humanities, and Multidisciplinary fields.

Stage 2: Arranging - comprising two sub-stages, organisation and purification
Organisation refers to the codebook researchers use to organise and categorise the articles included in the SLR. This study uses the TCM framework recommended by Paul et al. (2023), where T stands for Theory, C is for Context (s), and M for methods. Purification refers to the inclusion and exclusion of articles. This study excludes non-English articles since the authors are unfamiliar with other foreign languages. After restricting to English journal articles (n=124), the first screening based on titles led to the elimination of 110 articles. In the second screening, 15 more articles were removed after reviewing their abstracts. The third screening, which involved reading the full text, resulted in the elimination of 16 additional articles. Ultimately, 17 articles were included for the SLR.

Stage 3: Assessment stage, including the evaluation and reporting sub-stages
Evaluation in this review includes descriptive, performance, and content analyses. Based on identified limitations, it proposes future research directions addressing theoretical, contextual, and methodological gaps. The reporting sub-stage refers to summarising the findings of the study. The summaries can be represented by a combination of tables, figures, visualisation, and discussions.

Results
The first objective, to identify publication trends in chef competence literature, is achieved using descriptive analysis and performance analysis. Descriptive analysis is used to examine publication trends, while performance analysis identifies the most influential studies in the chef competence domain.

Publication trends
The content analysis of 17 articles revealed that research on chef competencies has evolved over the past two decades. However, the publications are infrequent rather than consistent. For example, the earliest recorded study dates back to 2000, with increased interest observed around 2010 and 2016. Both 2010 and 2016 saw higher publication counts. Despite this growth, research remained somewhat uneven from 2016 to 2023. The presence of recent studies in 2024 indicates continued interest, suggesting that chef competency is still a relevant topic in culinary and hospitality research. That said, a lack of continuous research output indicates that this area has not yet reached full maturity in hospitality academic treatises.

Most influential articles
Several studies have played a pivotal role in shaping the field of chef competency research. One of the most influential studies is by Zopiatis (2010), with 250 citations. This study explores whether culinary expertise is driven more by technical precision (science) or creativity (art), highlighting the need for chefs to balance both dimensions in their careers. Zopiatis (2010) finds that technical skills are prioritised, followed by leadership-management, while conceptual (creative-adaptive) skills rank low. Birdir & Pearson (2000), a highly cited study (213 citations), highlights key competencies for research chefs, stressing food science, product development, and industry-specific expertise. Their use of the Delphi method ensures expert-driven, consensus-based insights, making it a pivotal contribution to the field. Another key contribution comes from culinary education research by Müller et al. (2009), which questions whether culinary programs adequately prepare students for industry demands. The study finds a need for greater emphasis on leadership, business, and entrepreneurship. Bissett et al. (2010) also offer two impactful studies, one qualitative (17 citations) and one quantitative (23 citations), identifying 43 essential competencies. Their work underscores the importance of a balanced skill set combining technical, managerial, and creative abilities for modern chefs. While all studies agree on the importance of technical skills, they differ in their focus areas and methodological approaches. Birdir & Pearson (2000) use a Delphi approach, emphasising expert consensus on the competencies required for research chefs, whereas Zopiatis (2010) takes a more conceptual approach, exploring the art versus science debate in culinary skills. This difference suggests that while Birdir & Pearson (2000) focus on competencies within a specific career path (research chefs), Zopiatis (2010) takes a broader, philosophical approach to defining chef competencies. Müller et al. (2009) focus on culinary education effectiveness, assessing whether culinary curricula adequately prepare students for industry challenges. This contrasts with Bissett et al. (2010), who examine competencies from a professional and industry perspective, identifying critical competencies required for practising chefs rather than students. Together, these studies highlight the multi-dimensional nature of chef competencies, emphasising technical expertise, leadership, creativity, and industry-specific knowledge as essential for modern culinary professionals (Birdir & Pearson, 2000; Müller et al., 2009; Zopiatis, 2010). Our second research objective is to identify the dominant theoretical frameworks adopted in research. The review reveals the use of three theoretical frameworks: Katz (1955), Sandwith (1993), and Tas (1998).

Katz's (1955) model
Katz's framework, which categorises competencies into technical, human, and conceptual skills (Table 1), has been widely used in chef competency research to examine career progression and skill development (Gersh, 2016; Zopiatis, 2010). These skills are crucial at different levels of management, with technical skills being more critical at lower levels, human skills at all levels, and conceptual skills at higher levels. Technical skills are often highlighted as the most critical, and these include culinary expertise, such as cooking skills, taste and food knowledge, and service tightening (Ko, 2010; Mahfud et al., 2019; Zopiatis, 2010). Technical skills also involve innovative culinary competencies (E.g., technology, product development, and creativity) (Hu, 2010a; Hu, 2010b). Kitchen operations, ensuring food safety, and maintaining hygiene standards are also part

of the technical skills required for chefs (Ko, 2010). Human skills encompass interpersonal leadership and emotional intelligence. These shills are crucial (Mahfud et al., 2019; Marinakou & Giousmpasoglou, 2022) for managing kitchen staff, promoting teamwork, and ensuring smooth kitchen operations. Similarly, emotional intelligence is another critical human skill, enabling chefs to manage stress, communicate effectively, and maintain a positive work environment (Marinakou & Giousmpasoglou, 2022). Conceptual skills, though ranked lower by some respondents, are still essential. These include creative-adaptive competencies, business sense, and the ability to innovate and adapt to new culinary trends (Mahfud et al., 2019; Zopiatis, 2010). Another important conceptual skill is strategic thinking, which is necessary for career progression and achieving long-term goals in the culinary field (Marinakou & Giousmpasoglou, 2022).

Table 1: Competencies included in Katz (1955) Model

Skill Type	Description
Technical Skills	Culinary expertise, culinary management, food safety, hygiene
Human Skills	Interpersonal communication, leadership, and managerial skills
Conceptual Skills	Business acumen, innovation, and creativity

Though this framework is relevant for analysing chef competence, its application in recent years appears limited, as modern culinary environments demand a broader skillset beyond traditional management competencies.

Tas (1988) model

Richard E. Tas (1988) conducted a study to identify the key competencies required for hotel management trainees, as there was a lack of a standardised competency framework in hospitality education. He surveyed 75 U.S. hotel general managers to identify key managerial skills, starting with 70 competencies from literature and refining them to 36 through expert evaluation. These were categorised into three levels: essential, considerably important, and moderately important. Essential competencies included managing guest problems with sensitivity, maintaining professional and ethical standards, demonstrating professional appearance, effective communication, customer relations, and positive employee interactions. While the considerably important competencies comprised leadership, employee motivation, personnel management, operational problem-solving, and regulatory compliance, the third competence, moderately important competencies included financial analysis, marketing strategies, front-office operations, and budgeting (Table 2). Tas contended that these competencies should guide curriculum development and recruitment strategies, ensuring hospitality graduates meet industry expectations.

Table 2: Competencies studied in the Tas (1988) model

Category	Competency
Essential	Manages guest problems with understanding and sensitivity
	Maintains professional and ethical standards in the work environment
	Demonstrates professional appearance and poise
	Communicates effectively both in writing and orally
	Develops positive customer relations
	Strives to achieve a positive working relationship with employees based on perceptions of work interactions
Considerable Importance	Possesses needed leadership qualities to achieve organizational objectives
	Motivates employees to achieve desired performance
	Follows established personnel-management procedures in the supervision of employees
	Knows personnel policies and procedures that govern supervisory activities
	Effectively manages life-threatening situations (e.g., fire, bomb threat, serious illness)
	Identifies operational problems
	Follows federal, state, and local sanitation and safety regulations to ensure compliance by the organization
	Meets legal responsibilities associated with hotel operations
	Manages employee grievances effectively
	Delegates responsibility and authority to personnel according to departmental objectives
	Inspects cleaned hotel rooms according to standard operating housekeeping procedures
	Uses past and current information to predict future departmental revenues and expenses
	Assists in the development and control of departmental employee productivity
	Analyzes factors that influence the controllability of profits
	Assists in establishing organizational objectives and their priorities
	Appraises employee performance
	Uses past and current information to predict future hotel reservations
	Develops work-flow patterns to meet specific operational requirements
Moderate Importance	Analyzes weekly, monthly, and annual financial and statistical reports
	Conducts an informative and valid interview with prospective employees
	Promotes a cooperative union-management relationship
	Analyzes past and present business information to predict effective future marketing strategies
	Uses front-office equipment effectively (e.g., electronic cash registers, point-of-sale devices, and reservation systems)
	Assists in planning operational strategies
	Assists in developing and maintaining budgets for each important element of the organization
	Assists in developing a balanced program of preventative security
	Develops reliable revenue- and expense-tracking systems
	Processes hotel arrivals and departures
	Assists in developing an effective energy-management program
	Prepares weekly, monthly, and annual financial statistical reports

Source: Tas (1988:42)

Sandwith's (1993) model

Sandwith's (1993) competency model is a seminal framework used to map the knowledge, skills, and attitudes necessary for effective performance in various professions, including culinary arts. This model has been widely recognised and applied in chef competence research (Vogel et al., 2021). It has also influenced the design of culinary competency curricula (Hu, 2010a; Hu, 2010b), confirming that educational programs address the necessary knowledge, skills, and attitudes for culinary success. Building upon Katz's model, Sandwith's model introduced a more detailed five-dimensional competency framework (Table

3): Conceptual-creative (the cognitive skills needed for the job), leadership (the ability to turn ideas into productive action), interpersonal (skills for effective interaction with others), administrative (personal and financial management of the business), and technical (the knowledge and skills essential to producing the product or service) (Gersh, 2016)

Table 3: Competencies included in the Sandwith (1993) model

Dimension	Description
Conceptual	Focuses on cognitive skills and thinking, involves understanding the elements relevant to work, comprehends interdependencies and individualities within the organisation.
Leadership	Transforms thought into productive action, providing a strategic link between the conceptual and other dimensions by generating ideas for action.
Interpersonal	Involves effective communication skills such as listening, watching, reflecting, silencing, probing, summarising, and expressing ideas for direct and effective interaction.
Administrative	Covers people and financial management, indirectly related to technical operations, serving as a bridge between interpersonal and technical dimensions.
Technical	Relates to the practical and real work of the organisation, focusing on the product or service offered.

Source: Sandwith (1993)

Widely applied in hospitality education and industry research (Adeyinka-Ojo, 2018; Busulwa et al., 2022), Sandwith's model is often used to examine how chefs balance technical, leadership, and administrative roles (Zopiatis, 2010), offering a more comprehensive approach than Katz's framework. In recent years, this model has been increasingly applied to analyse the multifaceted role of chefs in fine dining (Allen & Mac Con Iomaire, 2017), hotel management (Talawanich & Wattanacharoensil, 2021), and culinary education (Marinakou & Giousmpasoglou, 2022). Sandwith's model remains widely used due to its comprehensive nature, especially in studies analysing chef leadership and career progression (Marinakou & Giousmpasoglou, 2022).

Tas (1996)

Building upon Sandwith's (1993) model, Tas and his colleagues conducted a study to identify the essential property-management competencies for hotel-manager trainees to bridge the gap between industry needs and hospitality education by developing relevant training programs. They identified 18 competencies based on qualitative and quantitative research approach based on Sandwith's five domains (Table 4).

Table 4: Competencies studied in the Tas (1996) model

Level of importance	Rank	Competency Statement	Domain
Essential	1	Interacts smoothly with a wide variety of people—e.g., customers, staff, contractors.	Interpersonal
	2	Operates effectively and calmly under pressure or in crisis situations.	Leadership
Considerable Importance	3	Maintains the "big picture" while working on a specific property-management, layout, and design component.	Conceptual
	4	Adapts to an efficient and comprehensive office-administration and record-keeping system.	Administrative
	5	Determines performance standards for specific job functions.	Administrative
	6	Plans property-management-worker assignments and scheduling.	Administrative
	7	Assesses property-management-worker assignments and scheduling.	Administrative
	8	Maintains an efficient and comprehensive office-administration and record-keeping system.	Technical
	9	Develops a layout and design plan promoting effective use of labour.	Conceptual
Moderate Importance	10	Implements the Americans with Disabilities Act regulations in the workplace.	Administrative
	11	Evaluates a fire-safety and -protection system.	Technical
	12	Develops a business plan for a food-service facility.	Conceptual
	13	Organises an efficient and comprehensive office-administration and record-keeping system.	Administrative
	14	Interprets the Americans with Disabilities Act regulations.	Administrative
	15	Plans a fire-safety and -protection system.	Technical
	16	Monitors the energy-management program.	Technical
	17	Analyse an energy audit.	Technical
	18	Conducts an energy audit.	Technical

Source: Tas (1996:94)

The study confirmed that interpersonal, leadership, and conceptual skills are more valued than technical expertise. However, it is important to understand that the study primarily surveyed general managers, who might prioritise leadership and administrative competencies over technical skills. However, the competencies identified might not fully be relevant to chefs (Table 5).

Table 5: Comparative analysis of the four competency models

Author (Date)	Details
Katz (1955)	Focus: Managerial Skills
	Competencies: Technical Skills, Human Skills, Conceptual Skills
	Industry Applicability: General Management
	Strengths: Simplicity and clarity, universally applicable across industries
	Limitations: Lacks industry-specific competencies
Sandwith (1993)	Focus: Competency Domains
	Competencies: Technical, Interpersonal, Conceptual, Leadership Administrative
	Industry Applicability: Hospitality and General Management
	Strengths: Comprehensive and detailed framework, recognises multiple domains of competencies
	Limitations: More complex and requires interpretation
Tas (1996)	Focus: Hospitality Industry Competencies
	Competencies: Leadership, Interpersonal Skills, Problem-Solving, Technical Knowledge, Communication Skills
	Industry Applicability: Hospitality Industry, Specifically Chef Competencies
	Strengths: Tailored to hospitality industry, Empirical validation in hospitality research
	Limitations: Focuses on hospitality only, limiting cross-industry relevance
Tas (1988)	Focus: Management Trainee Competencies
	Competencies: Essential Competencies, Considerably Important Competencies, Moderately Important Competencies
	Industry Applicability: Hotel Management Trainees
	Strengths: Significant importance to soft skills, such as leadership, problem-solving, and interpersonal communication
	Limitations: Lacks a structured classification of competencies

Source: Authors

The four foundational models of chef competence offer distinct perspectives, yet each has inherent strengths and limitations. For example, Katz's (1955) model provides a fundamental understanding of managerial skills by categorising them into technical, human, and conceptual skills. While this model is simple and universally applicable across industries, including hospitality, it does not account for the unique specialised demands of culinary industry, as technical expertise, creativity, and adaptability to high-pressure environments are highly crucial. Tas (1988), on the other hand, shifts focus to management trainees, categorising competencies into essential, considerably important, and moderately important competencies rather than domain-specific skills. While this prioritisation is useful in designing chef training programs, it lacks a structured classification of competencies, making it difficult to integrate into a broader chef competency framework. Building upon Katz Model, Sandwith (1993) expanded the competence model, introducing five competency domains: technical, interpersonal, conceptual, leadership, and administrative competencies, making it more comprehensive and structured. However, the model did not explicitly focus on the hospitality or culinary industries. In 1996, Tas advanced the competency model by addressing key skills relevant to chefs, such as leadership, problem-solving, technical knowledge, and communication skills. This industry-specific approach enhances its applicability in chef training and professional development. However, its narrow hospitality focus limits cross-industry comparisons, making it less useful for chefs transitioning to broader management roles outside of hospitality. A critical gap across all four models is their failure to address emerging competencies in the modern culinary industry. None of the models explicitly considers digital competencies, sustainability practices, crisis management, or innovation skills, which have become increasingly important in contemporary hospitality. With the growing integration of technology in kitchen operations, sustainability initiatives in food production, and the need for adaptability in global culinary trends, a more updated and holistic competency framework is necessary.

Context and country-wise distribution

Chef competence literature spans multiple sectors, such as food service industry (Birdir & Pearson, 2000) highlighting competencies required for research chefs and management-focused professionals. The Education sector has also been a focal point, with studies by Müller et al. (2008) emphasising the role of academic institutions in shaping culinary expertise. The evolving field of culinology (blend of culinary arts and food science) has also been investigated (Bissett et al., 2010) showcasing the increasing importance of scientific knowledge in culinary practices. Similarly, the essential competencies required for chefs has also been explored in the context of the hospitality industry (Riggs & Hughey, 2011; Zopiatis, 2010). A few studies have shed light on the technical and creative competencies required for culinary professionals (Chabongwa et al., 2024; Gersh, 2016; Shyr et al., 2018). In terms of geographic distribution, the chef competence research appears to be dominated by a few countries. Taiwan leads with five studies, followed closely by the United States, which has six studies distributed across different regions. Other contributions come from Malaysia, Cyprus, and Botswana, though in much smaller numbers. This suggests that chef competency research is concentrated in a few regions, with limited representation from other parts of the world, such as Europe, Africa, and South America. Expanding research in these regions could provide a more comprehensive and globally relevant understanding of chef competencies.

Methodology

Chef competency research has employed a variety of methodological approaches, broadly categorised into quantitative, qualitative, and mixed-methods studies. Each of these approaches provides unique insights into the evolving competencies required in the culinary profession. Quantitative research has been widely used to measure competencies through structured surveys and statistical analyses. These studies often assess the frequency and importance of various skills among chefs, using large-scale data collection methods. For instance, Bissett et al. (2010) conducted a quantitative assessment of 43 competency statements, highlighting key skills needed for professional chefs. This approach allows for objective comparisons and trend analysis across different studies and regions. On the other hand, qualitative research methods, such as interviews, case studies, and Delphi studies, are frequently used to gain deeper insights into chef competencies. Birdir and Pearson (2000) utilised a Delphi method, engaging industry experts to identify and validate key competencies required for research chefs. Zopiatis (2010) explored the art versus science debate in chef skills through conceptual discussions, providing a broader understanding of the evolving role of chefs. These qualitative approaches offer rich, in-depth perspectives on the skills and challenges faced by culinary professionals. A mixed-methods approach, combining both quantitative and qualitative techniques, has also been employed in chef competency research. This approach ensures a comprehensive analysis by integrating numerical data with expert opinions and case studies. Müller et al. (2008) used both survey data and qualitative insights to assess the effectiveness of culinary education in preparing chefs for industry challenges. By combining statistical evidence with experiential knowledge, mixed-methods research provides a well-rounded perspective on competency development. Research on chef competencies employs a diverse range of respondent groups, reflecting the multifaceted nature of the culinary profession. Table 6 shows that chef competence studies mainly involve professional chefs, executives, researchers, and chef-owners, offering insights into industry needs. Culinary students and hospitality graduates are also commonly studied to evaluate the effectiveness of culinary education. Culinary practitioners, educators, instructors, and professors are also surveyed to examine pedagogical approaches and curriculum development in culinary training programs. Industry professionals, such as R&D managers, culinology practitioners, and employers, contribute perspectives on the intersection of culinary expertise, business innovation, and market trends.

Table 6: Summary of respondents in chef competency studies

Respondents	Study
Research Chefs Management focused research Chefs	(Birdir & Pearson, 2000)
Research Chefs	(Bissett et al., 2010)
Research Chefs	(Bissett et al., 2010)
Chefs	(Zopiatis, 2010a)
Senior Executive Chefs, R&D Managers, Professors, Research Chefs	(Hu, 2010a)
Executive Chefs, R&D Managers and culinary Artist	(Hu, 2010b)
Hospitality Graduates	(Ko, 2010)
Students, Industry Management Professional	(Riggs & Hughey, 2011)
Culinology Practitioner, Employers of Culinology graduate	(Cheng & Bosselman, 2016)
Chefs/chefs owner, Educators	(Gersh, 2016)
Students, Teachers	(M. L. I. C. M. Hu et al., 2016)
Culinary Educators, high Performer chefs	(Nornazira et al., 2015)
Culinary instructors, Teppayaki professional, Owners	(Shyr et al., 2018)
Culinary Experts	(Suhairom et al., 2019)
Executive Chefs	(Chabongwa et al., 2024)

Future research directions

The fourth objective of this review is to recommend future research directions based on the research gaps identified. A research gap refers to an unexplored or underexplored area within a field of study, where insufficient information, conflicting findings, or missing perspectives exist. Identifying research gaps through literature reviews helps enrich knowledge, refine theories, and contribute to academic and practical advancements. Based on the review, this study identified several theoretical, empirical, methodological, contextual and application gaps.

Theoretical gaps

Theoretical gaps occur when existing theories do not fully explain a phenomenon or need modification to address new findings. First, many existing chef competence models focus heavily on technical culinary skills, such as cooking techniques and food knowledge, while potentially underestimating the importance of other competencies like leadership, managerial skills, and interpersonal abilities (Mahfud et al., 2019; Zopiatis, 2010). This narrow focus can lead to a lack of well-rounded chefs who are capable of managing teams and running kitchen operations effectively. Second, there is a lack of standardised guidelines for defining and measuring competencies in the culinary profession. This can result in inconsistencies in how competencies are assessed and developed across different educational institutions and workplaces (Suhairom et al., 2019; Vogel et al., 2021). The absence of a unified framework makes it challenging to ensure that all chefs meet a consistent standard of competence. Third, the existing models do not adequately address soft skills such as communication, motivation, and adaptability (Mahfud et al., 2019; Zopiatis, 2010), while these skills are crucial for a successful chef career. Fourth, the current models do not fully account for the unique challenges and learning contexts of different culinary environments. For example, the learning strategies and outcomes for chefs in high-end restaurants may differ significantly from those in more casual dining settings (Cormier-MacBurnie et al., 2015). This context-specific variability can limit the applicability of a one-size-fits-all competence model. Finally, the integration of technologies like virtual reality, AI into competence assessment is still in its early stages. While these technologies have shown promise in enhancing learning outcomes, their full potential and limitations need to be further explored (Castillo-Ortiz et al., 2024; Hu et al., 2023). An empirical gap arises when limited or no studies exist on a topic of discussion. Our findings suggest that despite many studies on chef competencies, several empirical gaps remain unaddressed, limiting the practical application of existing frameworks. To address these empirical gaps, Table 7 presents key research questions for future investigation

Table 7: Research questions for future studies

Research questions	Citations
What are the key competencies required for chefs in contemporary training programs?	Birdir and Pearson, 2000
How effective are current training and development programs in bridging the gap between academic learning and industry expectations?	Zopiatis, 2010
How do chef competency requirements differ across various countries and cultures?	Zopiatis, 2010
How can competency assessment tools be developed to evaluate chef competencies effectively?	Bissett, Cheng and Brannan, 2010
How do culinary students from different universities compare in their competency development and employability?	Müller, VanLeeuwen and Martin, 2008
What new competency statements should be introduced to align with advancements in food science, technology, and industry roles?	Birdir and Pearson, 2000
What key competencies should be prioritized in chef training programs to meet industry demands?	Birdir and Pearson, 2000
How do employers perceive the importance of chef competencies, and how does their perspective align with academic research?	Bissett, Cheng and Brannan, 2010
How do demographic factors (e.g., gender, age, ethnicity) influence chef competency development?	Riggs and Hughey, 2011

Methodological gap

Methodological gaps arise from reliance on either qualitative or quantitative methods, with limited use of mixed-method approaches. This limits comprehensive insights, as mixed methods capture both numerical trends and contextual depth. There is also inconsistency in using standardised measurement tools, with some studies using Likert-scale surveys and others relying on unstructured qualitative techniques. This lack of standardisation makes it difficult to compare findings across different studies and limits the generalizability of results. In terms of sampling technique, many studies do not explicitly discuss their sampling method or provide justification for the sample selection, raising concerns about biases in participant recruitment. A review of the samples used in chef competency research highlights a significant methodological gap in terms of respondent diversity and representativeness. The findings reveal that most studies primarily focus on research chefs, executive chefs, culinary students, and educators. While these stakeholders provide valuable insights, there is a noticeable lack of representation from other key stakeholders in the culinary and hospitality industries, such as line cooks, sous chefs, restaurant owners, and human resource professionals who influence hiring and training decisions. Many studies rely on convenience and purposive sampling, often selecting participants from academic institutions or professional chef associations without ensuring broader industry representation. This limits the generalisability of findings, as the competencies identified may not fully reflect the realities of diverse culinary work environments, such as small independent restaurants, large hotel chains, and institutional food services. There is also limited focus on cross-cultural samples, with most research conducted in specific geographic regions without comparative studies across different culinary traditions and markets. To address these gaps, future research should emphasise the use of robust mixed-method designs that integrate structured competency assessments with qualitative insights from industry professionals. The adoption of standardised measurement scales and well-defined sampling strategies will enhance the reliability and comparability of findings. Future studies should adopt more inclusive sampling strategies, incorporating a wider range of culinary professionals across various career levels and industry segments. Randomised and stratified sampling techniques should be employed to enhance the validity of findings, ensuring that competency frameworks developed through research are applicable across different cultural and professional contexts. By refining methodological approaches, researchers can generate more actionable insights that bridge the gap between academic research and industry needs.

Contextual gap

Contextual gap occurs when research is limited to specific populations, industries, or geographic regions, making findings non-generalizable. Our SLR identified several contextual gaps, notably a strong concentration of studies in North America, especially the U.S., Canada, and regions like Ohio and Kentucky, while research from other global contexts remains limited (e.g., Cyprus, Taiwan, Malaysia, and Botswana). However, there is a significant lack of research from culinary-rich regions, such as Europe, South-East Asia, South America, the Middle East, and Africa (excluding Botswana). The absence of studies from these regions limits the global applicability of existing competency frameworks, as cultural, economic, and industry-specific factors can significantly influence the skills required in different culinary contexts. Most studies focus on Western culinary practices, with limited exploration of competencies required in Asian, African, and Latin American cuisines. This creates a contextual gap, as the competencies essential for chefs working in diverse culinary environments may differ substantially from those emphasised in Western-centric research. Additionally, research tends to focus on chefs working in structured hospitality environments, such as hotels and fine-dining establishments, with little attention given to informal food service sectors, street food vendors, small independent restaurant owners, and chef entrepreneurs, particularly in developing economies. Future studies should, therefore, aim for greater geographic diversity by examining chef competencies in underrepresented regions and culinary traditions. Cross-cultural comparative studies could also provide valuable insights into how competency requirements vary across different gastronomic landscapes, enhancing the relevance of competency frameworks for a truly global hospitality industry.

Conceptual gap

Conceptual gap occurs when key concepts or definitions vary across studies, which leads to inconsistent interpretation. The findings of SLR reveal that the existing literature on chef competencies acknowledges significant conceptual gaps, particularly in the balance between technical culinary skills and broader managerial or leadership competencies. Research has traditionally focused on defining the fundamental skills required for culinary success, such as knife skills, food preparation, and sanitation knowledge, without adequately integrating the evolving role of chefs as leaders and business strategists (Chabongwa et al., 2024). Another major gap is the underestimation of creative-adaptive competencies (Zopiatis, 2010). While technical and leadership competencies are highlighted in a few studies, the conceptual skills-innovation, adaptability, and problem solving are considered less important. These competencies are crucial as chefs have to adapt to changing consumer trends, and dietary preferences continuously. Another gap is the distinction between the roles of chefs. Although roles like culinologists, research chefs, and executive chefs are distinct, research often generalises skill sets across career paths (Birdir & Pearson, 2000). Key areas like financial management and sustainability remain underrepresented in education and competency models (Bissett et al., 2010a, 2010b). Future research should refine these models to integrate artistic, scientific, leadership, and strategic skills essential for career growth.

Conclusion

The analysis of competency models reveals the evolution of managerial competencies from broad general management skills (Katz, 1955) to industry-specific frameworks tailored for hospitality (Tas, 1988; Tas, 1996). While Katz's model remains a foundational theory, its lack of industry-specific competencies limits its relevance in the context of chef competence. Sandwith's (1993) competency-domain model builds on Katz's work by categorising competencies into five domains, offering a more structured and adaptable framework that applies to both general and hospitality management. Tas's (1988) model is a ground-breaking attempt to define hospitality management competencies, highlighting the importance of soft skills, such as leadership and interpersonal communication. However, its lack of structured classification limits its effectiveness for competency-based assessment. Tas (1996) refined this approach by focusing specifically on hospitality property management, emphasising technical, administrative, and leadership competencies necessary for hotel and chef training. Thus, Sandwith's and Tas's models provide the strongest frameworks for studying chef competencies as they incorporate a multi-domain approach and industry-specific insights. The empirical, methodological, and contextual gaps identified in this study further highlight the need for a more comprehensive and globally relevant approach to chef competency research. Empirical gaps persist due to the limited focus on cross-cultural competency comparisons and the lack of employer perspectives on essential chef competencies. Methodological limitations, such as the predominant reliance on either qualitative or quantitative methods without sufficient integration of mixed-method approaches, restrict the depth of understanding in competency assessment.

Inconsistencies in measurement tools and sampling strategies hinder comparability across studies, emphasising the need for standardised frameworks that allow for robust, replicable findings. The concentration of studies in Western countries limits the generalizability of existing competency models. The lack of research on chef competencies in regions with rich culinary traditions, the need for cross-cultural studies that explore diverse culinary environments. Addressing these gaps requires a multidisciplinary research agenda that integrates theoretical, empirical, methodological, and contextual perspectives. Future studies should aim to refine competency models that balance technical, managerial, and creative-adaptive skills, ensuring chefs are equipped to navigate the evolving demands of the culinary industry. A holistic and globally inclusive framework for chef competencies will enhance culinary education and strengthen the industry's ability to adapt to technological advancements, sustainability concerns, and changing consumer expectations.

Limitations

Despite its significant contribution to the literature, this study has several limitations. First, it only includes journal articles indexed in Scopus and Web of Science, excluding other sources, such as conference papers and industry reports, which may contain valuable insights. Second, the study focuses primarily on English-language publications, overlooking relevant research in other languages. Finally, while this review identifies theoretical, contextual, and methodological gaps, it does not provide an empirical validation of proposed future research directions. Addressing these limitations in future studies, such as expanding data sources and incorporating non-English articles, will enhance the comprehensiveness and applicability of chef competency research.

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