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Validation of the Chefs' Key Competencies Questionnaire: A Culinary Student Perspective

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Abstract: The chef is considered a success factor for culinary tourism. Hence, mastering the chefs' key competencies through culinary schools is very important. Many studies have examined chef competencies, but we have not yet discovered how to measure the chefs' key competencies according to culinary student perceptions. This study involved 392 culinary students in public vocational high schools. Data was collected by proportional random sampling through a questionnaire distributed to seven public vocational schools in Yogyakarta, Indonesia. Questionnaire validation used three techniques, namely, content validity test with Aiken V analysis, small sample validity test with Pearson correlation analysis, and finally, CFA analysis. This study shows that culinary students' perceptions of chefs' key competencies can be explained by indicators of creativity, culinary skills, hygiene & food safety, aesthetics, business sense, interpersonal, managerial, and leadership. Chefs' Key Competencies Questionnaire (CKCQ) consists of 30 items consisting of creative (3 items), culinary skills (5 items), hygiene & food safety (4 items), aesthetics (2 items), business sense (4 items), interpersonal (3 items), managerial (4 items), and leadership (5 items). All items (30 items) have good validity and reliability values. The findings of this study discuss in-depth and some implications for vocational education practitioners proposed for further improvement. VET practitioners can also use this questionnaire to evaluate the achievement of the chefs' key competencies of culinary students and professional chefs.

Keywords: Chef, key competencies, core competencies, culinary expertise, CFA

1.   Introduction

The study of culinary tourism has been widely carried out by scholars especially in examining the importance, impact, and sustainability of tourists, the economy, and the consumer market (Baldwin, 2018; Ian, 2016; Mahfud, Mulyani, Indartono & Setyawati, 2018; Mahfud, Pardjono & Lastariwati, 2019; Quigley, Connolly, Mahon & Iomaire, 2019). The study conducted by Mahfud et al. (2019) showed that chefs are a vital aspect to the success of culinary tourism. The expertise of chefs to create food products that have high quality is an aspect that encourages the sustainability of culinary tourism, mainly to provide satisfaction for tourists. Kristanti et al. (2018) stated that the tourists' happiness in their culinary tourism experience is mostly determined by how well the quality of the culinary products presented. It means that product quality is essential to support culinary tourism (Suna & Alvarez, 2019). Thus, the satisfaction of tourists needs attention to encourage them to return to culinary tourism visits. An understanding of the importance of providing

tourist dining satisfaction will bring success and sustainability of culinary tourism. However, the success and sustainability of culinary tourism is very dependent on how good the quality of the chef as a key holder of culinary tourism success.

Several definitions of chefs have been proposed. Previous studies primarily defined chefs as professional culinarians tasked with preparing food and dishes in all ways of operating a restaurant (Baldwin, 2018; Mahfud, Jati & Mulyani, 2017; Mahfud et al., 2019). A similar definition was also conveyed by Hegarty (2008), according to him, a chef is a person who cooks professionally for others and refers to highly skilled professional chefs who are proficient in all aspects of food preparation. Besides, chefs are seen as managers, innovators, tastes, and artists by many people both inside and outside the culinary field (Culinary Institute of America, 2012; Mahfud et al., 2019). Also, the image of the chef is considered to affect significantly the experience of customers visiting culinary tourism (Chen, Peng and Hung, 2016). In this context, the ability of the chef to present a pleasant dining experience for guests is considered very important. Therefore, the creativity of chefs to find new ideas about culinary dishes becomes the main key in providing a positive dining experience for guests (Esa, Salleh and Mohamad, 2017). Referring to this understanding, it is not surprising that most tourism practitioners depend on the success of culinary tourism in the chef profession. Also, they develop various educational and training programs to prepare professional chefs, including culinary schools.

Many studies have examined the competencies that a chef must have to support the culinary tourism success and the importance of developing these competencies through educational programs. There are many chef competencies to promote their professionalism, but mastery of key competencies is considered an essential skill for chefs. Mahfud et al. (2019), in their literature review study, stated that the chefs' key competencies consist of culinary expertise, conceptual, hygiene and food safety, business sense, interpersonal, leadership, managerial, and motivational. Also, Zhang and Yu (2018) revealed that chefs, as one of the creative people in the development of tourism, are essential resources. Pang (2017) recommends that chefs play a crucial role in providing content that encourages gastronomic discourse and also in providing good experiences on the plate to visitors. Hence, developing the chefs' key competencies in culinary schools is considered essential to prepare professional chefs.

Although there have been many studies that show that chefs play an essential role in the development of culinary tourism, so far we have yet to find out how to measure of chefs' key competencies for culinary school students. Most studies of chefs only focus on identifying chef competencies. In the meantime, we haven't found the chefs' key competency measurements. In particular, we have not yet found a chefs' key competency measurement questionnaire for culinary students. Based on this extensive study, it is necessary to conduct studies to develop a survey of chefs' key competency. This questionnaire is useful for culinary schools to evaluate the achievement of student competencies in the field of chefs occupational. Thus, this study aims to develop and validate a chefs' key competency questionnaire for culinary students using the Confirmatory Factor Analysis (CFA) technique.

2.   Literature Review

Currently, the need for workers' qualifications is very dynamic. This condition encourages vocational education to harmonize the education concept with the needs of the work world. One of the strategies to deal with the dynamic of changing needs is that vocational education graduates need to be equipped with a set of key competencies that serve as a basis for capacity development in the next learning cycle (Dumitrescu, Drăghicescu, Olteanu and Suduc, 2014), especially in developing performance skills in their field of expertise (ASEAN, 2013). This key competency must be based on values that have clarity and durability that provide stability, and the selected values have a clear order to adapt to these changes (Gutek, 1974).

Mastery of key competencies in culinary students is considered to support success in a career as a chef. A chefs' key competencies consist of soft skills and hard skills but mostly consist of a soft skill set. Many hospitality industries consider the mastery of soft skills more important than hard skills because soft skills are considered basic skills for developing job capabilities (Mahfud et al., 2017). Also, soft skills training takes a long time, so it is not effective if done in the workplace. However, both soft skills and hard skills are critical to be mastered by culinary students to become skilled workers.

2.1   Chefs' Key Competencies

Current conditions in the tourism sector require a type of competency that is interdisciplinary (Zehrer & Mössenlechner, 2009). Interdisciplinary competence means that the development of key competencies in the field of tourism is used to complete tasks and functions of work in allied and relevant fields, especially in the type of work in the field of tourism, which includes travel services and hotel services, including the chef profession. Key competencies are needed by individuals both in developing personal and career aspects to cope with changing circumstances in the world of work.

However, until now, there was no agreement on what key competencies were essential and how the competency acquisition approach found its way through the education system (Zopiatis, 2010). In general, competence can be characterised as a combination of knowledge, skills, and attitudes needed to work well in certain situations in a profession (Verhaeghe, Vanhoof, Valcke and Van Petegem, 2011). According to ASEAN (2013), competence is all about proven performance output, which includes knowledge, skills, and attitudes related to a system or set of minimum standards

required for effective performance in the workplace. According to Dumitrescu et al. (2014), key competencies include not only a set of knowledge but also a set of abilities, attitudes, and values. Meanwhile, Tuparova et al. (2014) revealed key competencies as a combination of knowledge, skills, and attitudes that are appropriate to the context. In short, key competencies are general skills needed for performance criteria to be achieved at the level of work required for a role and function in a particular job (Menteri Tenaga Kerja & Transmigrasi Republik Indonesia, 2007).

In the Framework of the ASEAN Common Competency Standards for Tourism Professionals (ACCSTP), the competency components, which include knowledge, skills, and attitudes, are represented in three related skill groups, namely core competencies, generic competencies, and functional competencies. The key competencies in this study cover all three aspects. According to Mahfud et al. (2019), chefs' core competencies consist of hygiene and food safety, creative, aesthetic, and business sense. The generic competencies of chefs include interpersonal, leadership, and managerial. Meanwhile, the functional competencies of chefs are culinary expertise.

2.2 Chefs' Core Competencies

Core competencies are competencies agreed upon by the industry and are very important to achieve if a person must be accepted as a competent workforce in certain major work divisions (ASEAN, 2013). This competency is directly related to the main work tasks (Azid et al., 2019) and includes units such as working effectively with colleagues and customers and implementing occupational health and safety procedures. Specifically, the chefs' core competencies include hygiene and food safety, creativity, and aesthetics (Mahfud et al., 2019). This study highlights that quality food is not only related to flavor but also safe and healthy for consumers. Also, some studies have stated that chefs must pay attention to hygiene and health aspects during the production process delivered by several scholars (Birdir and Pearson, 2000; Bosselman, 2016; Zopiatis, 2010). Although the cleanliness aspect is considered necessary, this aspect needs to be complemented by excellent food safety practices. Empirically, Rebouças et al. (2017) argue that proper food safety knowledge and practices are one of the qualifications of a chef.

The chef is seen as a person who is very thorough in combining the limits of creativity and the desire to present a pleasant dining experience for their guests (Ruhlman, 1999). Perhaps many chefs can cook food, but few of them can create innovative and creative food products. Other scholars (Horng & Hu, 2008; Hu, 2010; Jeou-Shyan & Lee, 2009; Zopiatis, 2010) report that there are seven critical dimensions of chefs' core competencies and one of them is creativity and aesthetics. Culinary tourism competition in the future is very tight, and chefs need to learn more about how to control the creative process and innovation (McBride & Flore, 2019). Even according to Presenza and Petruzzelli (2019), in their study, highlighted that innovation is the primary driver in the restaurant business competition. Innovation in cooking involves developing new ideas and combining various aspects of cooking styles, such as integrating modern ways of cooking in the preparation of traditional dishes. The ability to find new ideas is vital to create and develop culinary business opportunities (Allen & Mac Con Iomaire, 2017; Bosselman, 2016).

2.3 Chefs' Generic Competencies

Generic competencies are competencies agreed upon by the industry and are very important to achieve if a person must be accepted as a competent workforce in certain secondary work divisions (ASEAN, 2013). Usually, generic competencies are often associated with the term life skills as well as the ability to use standard tools and technology, and the ability to manage and resolve conflict situations. Chefs' generic competencies include interpersonal, leadership, and managerial skills (Mahfud et al., 2019). In this context, developing a chefs' image is very important to create excellent quality service. Chefs' profiles are not only related to cooking skills, but also excellent interpersonal skills. Interaction with customers positively influences their culinary experiences (Chen et al., 2016). Interpersonal skills include communication skills, verbal and writing skills, and knowledge of various cultures (Mohamad et al., 2019; Zopiatis, 2010).

Besides, leadership aspects are needed by head chefs to improve product quality and their reputation as professional chefs (Wellton, Jonsson and Svingstedt, 2017). His study also states that horizontal leadership and management practices in the restaurant industry are for growth and development. Studies conducted by Allen and Mac Con Iomaire (2017) reveal that the success of head chefs in Ireland is influenced by factors of professionalism, individual characteristics, leadership skills, management skills, and interactions with work contexts. Chefs, as professionals, are required to have planning and management skills (Suhairom, Musta'amal, Mohd Amin, Kamin and Abdul Wahid, 2019). Managerial skills are needed by executive chefs to manage operations in the food and beverage division.

2.4 Chefs' Functional Competencies

Functional competencies are particular competencies needed to perform roles or jobs in work divisions and include specialised skills and knowledge (know-how) to work effectively, such as the ability to receive and process bookings, provide housekeeping services for guests, and operate facilities bar (ASEAN, 2013). In the context of this study, the functional competencies of chefs are culinary expertise. Most scholars agree that an essential skill for chefs is culinary expertise. The Delphi technique, as done by Birdir and Pearson (2000) has shown that a chef must know the taste and the

ability to distinguish levels of quality in food products. The results of his studies also prove that culinary technical expertise has priority interests and development.

Many recent studies (for example, Antun & Salazar, 2005; Bosselman, 2016; Johnston & Phelan, 2016; opiatis & Constanti, 2007) have shown that chefs must master food processing. Also, chefs need to learn the knowledge of foodservice operations, the expertise of culinary flavours, and knowledge of recipes, menu development, products, and culture (Hu, 2010; Zopiatis, 2010). Technical knowledge and skills such as mastery of cooking techniques for chefs are essential as the basis for developing culinary products. Particularly insight into cooking technology trends is also necessary for chefs to keep up with consumer market trends. Todays' chefs use a variety of tools to gather inspiration and gain new knowledge, including culture. But what needs to be highlighted is that a successful chef does not mean a chef who can cook something, but a chef who understands and can create foods that have a great taste (produce food which tastes excellent) and ultimately is liked by consumers (Baldwin, 2017). All of this literature emphasizes that the culinary expertise of chefs in the form of food processing, food service knowledge, knowledge of culinary flavours, food knowledge, recipe knowledge, and menu development need to be possessed by a chef.

Thus, it can be understood that the chefs' key competencies have descriptive attributes such as culinary expertise, conceptual, hygiene, and food safety, business sense, interpersonal, leadership, managerial, and motivational. This explanatory attribute will then be used as an indicator in developing the chefs' essential competency questionnaire.

3. Methods

3.1 Participant

This study targeted third-grade students in public culinary vocational high schools as respondents. The questionnaire was distributed to culinary students in seven culinary vocational schools in Yogyakarta, Indonesia. The total population of the study was 950 third-grade students in public culinary vocational high schools, and the number of samples received was 392 respondents (Isaac & Michael, 1981). The respondents consisted of 46 male students and 346 female students. The sampling technique for selecting respondents in seven culinary vocational schools in Yogyakarta was proportional random sampling (see Table 1). Data were collected using self-administered questionnaires, where respondents answered questions contained in the survey without the assistance of data collection officers (De Leeuw, 2008). The poll was delivered to respondents directly and taken back by the data collection officer.

Table 1 - Background of participants (N=392).

Attribute	Categories	Population	Sample (N)	%
Gender	Male	111	46	11.7
	Female	839	346	88.3
School	Culinary School A	120	50	12.8
	Culinary School B	125	52	13.3
	Culinary School C	85	35	8.9
	Culinary School D	56	23	5.9
	Culinary School E	94	39	9.9
	Culinary School F	190	78	19.9
	Culinary School G	280	115	29.3

Besides, testing the content validity involved an expert judgment of three people. They consist of one expert in the field of psychometry, one expert in the field of culinary education, and one expert in the field of vocational training. Their selection as expert judgment aims to support the depth of the chefs' key competency measurement questionnaire assessment.

3.2 Instrument

The Chefs' Key Competencies Questionnaire (CKCQ) was developed from previous studies (Allen & Mac Con Iomaire, 2017; Birdir & Pearson, 2000; Mahfud et al., 2019; Zopiatis, 2010). Based on previous studies, eight key competency constructs of chefs were obtained that include culinary expertise, food hygiene and safety, creative, aesthetic, interpersonal, business sense, leadership, and managerial. The eight key competencies are used as indicators in this study. Then each indicator is broken down into smaller components. These components are the questions in the Chefs' Key Competencies Questionnaire (CKCQ). CKCQ was totalling 33 items consisting of culinary expertise (5 items), cleanliness and food safety (4 items), creative (4 items), aesthetics (4 items), interpersonal (4 items), business sense (4 items), leadership (5 items), and managerial (5 items). This instrument used a Likert scale with five alternative answers, namely strongly agree, agree, neutral, disagree, strongly disagree, which were numerically represented as strongly agree = 5, agree = 4, neutral = 3, disagree = 2, strongly disagree = 1.

3.3   Procedure

The validity testing of the CKCQ questionnaire consisted of three stages. In the first stage, the content validity of the CKCQ was determined through the expert validation process. This validation was carried out by involving three experts consisting of experts in psychometry, culinary education, and vocational education. Each expert was given a set of questionnaires to assess the appropriateness and relevance of the instrument items to the study indicators. The relevancy scale used in questionnaire was a five-point scales consisting of "highly irrelevant" = 1, "irrelevant" = 2, "quite relevant" = 3, "relevant" = 4, "very relevant" = 5. The data were analysed using Aiken V (Aiken, 1985).

In the second stage, CKCQ pilot testing using small samples. The number of samples used was 59 respondents. We use the Pearson Correlation Analysis at 5% significance to test item validity. Items are considered valid if they have a significant value below 0.05. Meanwhile, we use Cronbachs' Alpha analysis to test the reliability of the CKCQ questionnaire. Items are considered reliable if they have a Cronbachs' Alpha value above 0.7 (Retnawati, 2016). Data analysis uses SPSS 19.0 for Windows Evaluation Version software.

In the final stage, the construct validity test of the CKCQ questionnaire uses confirmatory factor analysis (CFA). Confirmatory factor analysis was performed with the help of SPSS Amos 21 for Windows. The study of the development of this instrument uses the acceptance limit of the standardised loading factor or the parameter value of lambda (λ) above 0.5 (Ghozali, 2017).

4.   Result

Development of a chefs' key competency questionnaire using theoretical references and relevant previous studies. After obtaining a draft of the chefs' key competency questionnaire, the questionnaires' validity and reliability were tested. Testing the validity and reliability of the questionnaire includes content validity with Aiken V, pilot testing with small samples, construct validity of CKCQ, and testing the reliability test.

4.1   Content Validity: Aiken V

The results of the content validity analysis using Aiken V show the value of the content-validity coefficient (Aiken index) on 35 items (items 1-35) of the key competency instruments of chefs ranged from 0.83 to 1.00 (see Table 2). The Aiken V index means that all items of the key competency instruments of chefs have high validity because they have an Aiken V index of more than 0.8 (Retnawati, 2016).

Table 2 - The contents validity using Aiken V.

Items	Aiken Index	Validity
CE1 - CE5	0.92 ~ 1.00	Strong
HFS1 - HFS4	0.83 ~ 0.92	Strong
Creat1 - Creat4	0.92 ~ 1.00	Strong
Aesth1 - Aesth4	0.92 ~ 1.00	Strong
Inter1 - Inter4	0.92 ~ 1.00	Strong
BS1 - BS4	1.00	Strong
Lead1 - Lead5	0.92 ~ 1.00	Strong
Manag1 - Manag5	1.00	Strong

Note: CE1-CE5 = items of culinary expertise; HFS1-HFS4 = items of hygiene and food safety; Creat1-Creat4 = items of creative; Aesth1-Aesth4 = items of aesthetic; Inter1-Inter4 = items of interpersonal; BS1-BS4 = items of business sense; Lead1-Lead5 = items of leadership; Manag1-Manag5 = items of managerial.

4.2   Pilot Testing with Small Samples

After the Aiken V test, the questionnaire was tested on 59 culinary vocational students to test validation and reliability. The significance of the Pearson Correlation Analysis results showed that two items were invalid because they have a value of p > 0.05. The invalid items are one item from the aesthetic indicator (Aesth1, r = 0.111, p = 0.404) and one item from the interpersonal indicator (Inter1, r = 0.059, p = 0.660). Furthermore, these two items were not used in data collection in this study. Thus, the total number of instruments used to measure the chefs' key competencies amounted to 33 items consisting of culinary expertise (5 items), cleanliness and food safety (4 items), creative (4 items), aesthetics (3 items), interpersonal (3 items), business sense (4 items), leadership (5 items), and managerial (5 items). Table 3 shows the Pearson Correlation Analysis values of the 33 items ranging from r = 0.267 - r = 0.736 and significant at the 0.05 significance level (Hair, Black, Babin and Anderson, 2010).

Table 3 - Validation test of Chefs' Key Competencies Questionnaire in small samples (33 items).

Items	Pearson Correlation	Sig. (2-tailed)
CE1 - CE5	0.339** ~ 0.583**	0.000 ~ 0.009
HFS1 - HFS4	0.425** ~ 0.508**	0.000 ~ 0.001
Creat1 - Creat4	0.267** ~ 0.586**	0.000 ~ 0.041
Aesth2 - Aesth4	0.378** ~ 0.581**	0.000 ~ 0.003
Inter2 - Inter4	0.391** ~ 0.529**	0.000 ~ 0.002
BS1 - BS4	0.499** ~ 0.632**	0.000 ~ 0.000
Lead1 - Lead5	0.360** ~ 0.693**	0.000 ~ 0.005
Manag1 - Manag5	0.359** ~ 0.736**	0.000 ~ 0.005

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

Meanwhile, the overall chefs' key competencies questionnaire also showed a Cronbachs' Alpha score of 0.908, this value was above 0.700, and it meant that the survey was judged to be reliable to measure the culinary students' perceptions of the chefs' key competencies.

4.3   Construct Validity of CKCQ

We use CFA to test the construct validity of the CKCQ. The CFA results on the chefs' key competencies questionnaire are shown in Figure 1. The estimation results of the model measurements in Figure 1 using the Maximum Likelihood estimation on Amos show that the fit model is good enough. However, there is still a standardised loading factor or lambda parameter value (λ) below 0.5, namely the items Creat4 ($\lambda = 0.32$), Aesth2 ($\lambda = 0.23$), and Manag5 ($\lambda = 0.49$). Ghozali (2017) states that the critical limit value used is the loading factor or parameter value λ (lambda) of at least 0.5. Furthermore, the three items were eliminated from the model because they did not meet the cut off value (≥ 0.5), and some modifications were made to get a good fit model.
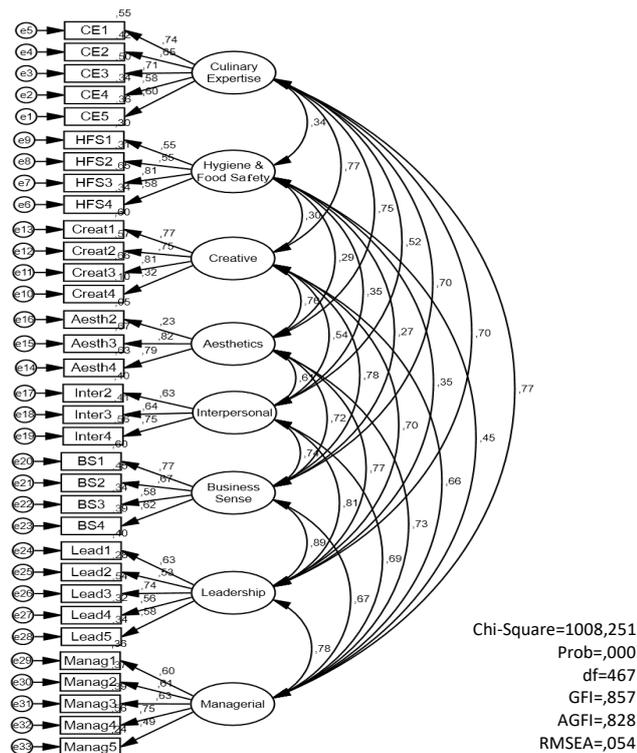

Fig. 1 - Measurement model of Chefs' Key Competencies Questionnaire.

The estimation results of the model measurements on the modified model (see Figure 2) show good fit model results (see Table 4) and are accompanied by loading factor values on all of the items above $\lambda = 0.50$ (see Table 5). The model fit test in Table 2 shows the criteria of Chi-square, Cmin / df, GFI, AGFI, RMSEA, RMR, TLI, CFI, and NFI provide conformity indexes that correspond to recommended limits. However, the probability level criteria indicate that the requirements are not fit because they exceed the recommended limits. In total, 9 indices show the results of the fit model. Thus, it can be concluded that the chefs' key competency measurement model has a good fit.
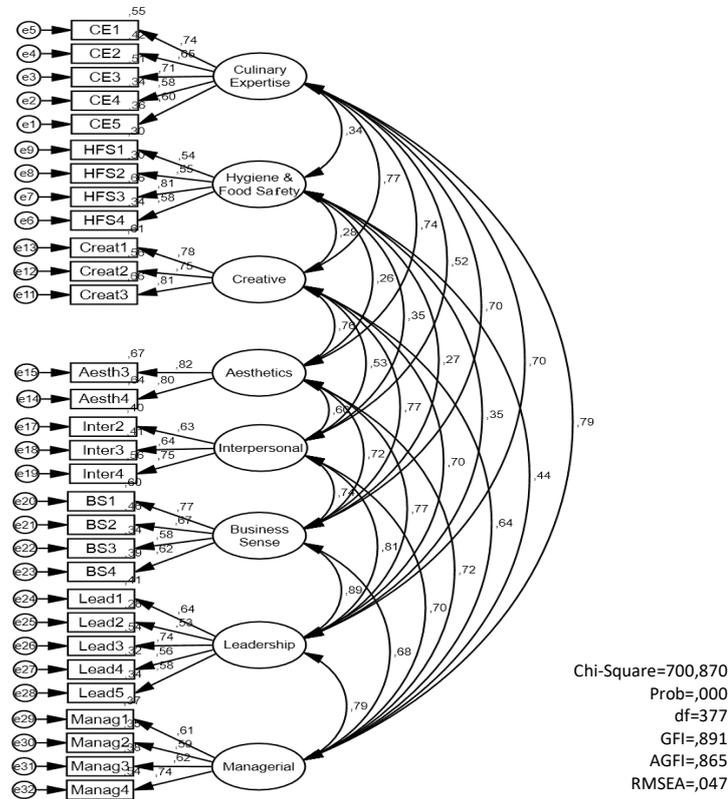

Fig. 2 - Measurement model of the modification of Chefs' Key Competencies Questionnaire.

Table 4 - The goodness of fit index of Chefs' Key Competencies Questionnaire.

The goodness of Fit Measure	Index Value	Cut off-value	Note
df	377		
Chi-square of estimate model	700.870	< 2 df	Model fit
Probability level	0.000	> 0.05	The model does not fit
Cmin/df	1.859	≤ 5	Model fit
Goodness of Index (GFI)	0.891	GFI ≥ 0.9 = good fit; 0.8 ≤ GFI < 0.9 = marginal fit	Marginal fit
Adjusted Goodness of Index (AGFI)	0.865	AGFI ≥ 0.9 = good fit; 0.8 ≤ AGFI < 0.9 = marginal fit	Marginal fit
RMSEA	0.047	≤ 0.08	Model fit
RMR	0.027	< 0.05	Model fit
Tucker-Lewis Index (TLI)	0.917	TLI ≥ 0.9 = good fit; 0.8 ≤ TLI < 0.9 = marginal fit	Model fit
Comparative Fit Index (CFI)	0.928	CFI ≥ 0.9 = good fit; 0.8 ≤ CFI < 0.9 = marginal fit	Model fit

Table 4 - (Continue)

The goodness of Fit Measure	Index Value	Cut off-value	Note
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Tucker-Lewis Index (TLI)	0.917	TLI ≥ 0.9 = good fit; 0.8 ≤ TLI < 0.9 = marginal fit	Model fit
Comparative Fit Index (CFI)	0.928	CFI ≥ 0.9 = good fit; 0.8 ≤ CFI < 0.9 = marginal fit	Model fit
Normo Fit Index (NFI)	0.858	NFI ≥ 0.9 = good fit; 0.8 ≤ NFI < 0.9 = marginal fit	Marginal fit

Meanwhile, the results of the standardised loading factor value points for each indicator are shown in Table 5. Each item measuring the key competency of the chef has a parameter value λ (lambda) above 0.5. This result means that a total of 30 items is declared valid to measure culinary students' perceptions about their chefs' key competencies. Besides, these results also show that students' perceptions of chefs' key competencies can be explained significantly by indicators of culinary expertise, hygiene and food safety, creative, aesthetic, interpersonal, business sense, leadership, and managerial.

Table 5 - Standardised regression weights on each item of Chefs' Key Competencies Questionnaire.

Path			Estimate	P-value
CE1 – CE5	<---	Culinary Expertise	0.583 ~ 0.739	***
HFS1 – HFS4	<---	Hygiene & Food Savety	0.544 ~ 0.811	***
Creat1 – Creat3	<---	Creative	0.751 ~ 0.811	***
Aesth3 – Aesth4	<---	Aesthetics	0.798 ~ 0.818	***
Inter2 – Inter4	<---	Interpersonal	0.631 ~ 0.746	***
BS1 – BS4	<---	Business Sense	0.582 ~ 0.772	***
Lead1 – Lead5	<---	Leadership	0.526 ~ 0.736	***
Manag1 – Manag4	<---	Managerial	0.593 ~ 0.737	***

*** The p-value is very small (smaller than 0.001)

4.4   Reliability Test

The reliability test in this study uses the reference construct reliability values in SEM. This test is used to determine the reliability and consistency of data from a research instrument. The limit of acceptance criteria for construct reliability values above 0.7. However, Amos does not have an output to find out how much the construct reliability value is, so it is calculated using the following formula:

$$Construct\ Reliability = \frac{(\sum Std.\,loading)^2}{(\sum Std.\,loading)^2 + \sum \varepsilon_j}$$

The results of the construct reliability test for the chefs' key competencies questionnaire are shown in Table 6. These results indicate that overall indicators, including culinary expertise, food hygiene and safety, creative, aesthetic, interpersonal, business sense, leadership, and managerial, have to construct reliability values above 0.7. The creative indicator has the highest construct reliability value than the other indicators. Meanwhile, the lowest construct reliability value is shown in the leadership indicator. Thus, students' perceptions of chefs' key competencies can be explained or measured with indicators of culinary expertise, food hygiene and safety, creative, aesthetic, interpersonal, business sense, leadership, and managerial.

Table 6 - Reliability model measurement of Chefs' Key Competencies Questionnaires.

Indicators	Construct Reliability	Note
Culinary Expertise	0,882	Reliable
Hygiene & Food Safety	0,881	Reliable
Creative	0,889	Reliable
Aesthetics	0,874	Reliable
Interpersonal	0,833	Reliable
Business Sense	0,856	Reliable
Leadership	0,822	Reliable
Managerial	0,829	Reliable

5. Discussion

The role of culinary schools to prepare prospective professional workers in the culinary field has been in the highlight. The culinary school is considered an essential program for developing professional chefs through the education system. And in the end, a professional chef will have an impact on the successful development of culinary tourism. Previous studies have agreed that the ability of chefs to process food can provide a positive dining experience for tourists. Many studies have examined chef competencies, but how to measure key competencies is still not discussed. This study uses analysis of Aiken V, Pearson Correlation Analysis, and CFA to develop a chefs' key competencies questionnaire for culinary students.

This study revealed that the Chefs' Key Competencies Questionnaire (CKCQ) was able to measure students' perceptions of the chefs' key competencies, although some items were eliminated. We have tested the validity of this CKCQ by using three methods. A total of 35 CKCQ items have been reduced to 30 items after the validation test. In the first stage, the entire Aiken V test (35 items) was declared valid and relevant. Still, there was the elimination of two items (Aesth1 and Inter1 items) in the small sample validation test because it had a p-value above 0.05. Next, 33 items of this questionnaire were tested by CFA with Amos. At the CFA test stage, three items were deleted because they had a standardised loading factor below 0.5, namely the items Creat4 ($\lambda = 0.32$), Aesth2 ($\lambda = 0.23$), dan Manag5 ($\lambda = 0.49$). Thus, 30 questionnaires were obtained to measure students' culinary perceptions of their chefs' key competencies. The CKCQ questionnaire consisted of culinary expertise (5 items), cleanliness and food safety (4 items), creative (3 items), aesthetics (2 items), interpersonal (3 items), business sense (4 items), leadership (5 items), and managerial (4 items).

The results of this study confirm that culinary students' perceptions of chefs' key competencies can be measured using indicators of culinary expertise, hygiene and food safety, creative, aesthetic, interpersonal, business sense, leadership, and managerial. Creative indicators have the best reliability compared to other indicators. This finding is relevant to the future competency needs of chefs who encourage chefs to have creativity and innovation (Presenza & Petruzzelli, 2019; Zopiatis, 2010). Also, in general, top chefs are directly involved in the creative process and innovate without limits to maximise the progress of the culinary business (Presenza & Petruzzelli, 2019). According to Wellton et al. (2017), creativity is part of the skill of the head chef, this skill will develop over time, and the chefs' work experience. The creativity of the chef is believed to be able to provide an exciting dining experience for tourists (Ruhlman, 1999). But different results revealed by Zopiatis (2010), he said that technical competence (specifically culinary) was considered as the most important, followed by leadership-management capability. Conversely, conceptual competency (adaptive creative) is ranked low by respondents. Although the ranking of aspects of creativity has different priorities from several studies, the elements of technical ability or culinary expertise show results that are not much different. For example, Zopiatis (2010) argues that culinary expertise as a priority related to chef competence. Meanwhile, this study shows culinary expertise as the second priority after creativity.

In principle, these two competencies (culinary expertise and creativity) are important to be owned by chefs in the future. Culinary expertise is the basic skill of a chef, while creativity is needed to support the sustainability of culinary tourism in facing the dynamics of consumer needs. Zhang and Yu (2018) stated that chefs are an essential resource and one of the creative people in the development of tourism. Furthermore, the reliability indicator of the chefs' key competency questionnaire based on ratings, namely hygiene & food safety, aesthetics, business sense, interpersonal, managerial, and leadership. This study showed leadership as the last ranking indicator of its reliability value. This result is reasonable because respondents of this study are culinary vocational students who tend to have low leadership abilities—thus giving an impact on the filling of self-report leadership on the chefs' key competency questionnaire. Although professional chefs need leadership skills (Garrigos, Haddaji, Segovia & Signes, 2019), this study revealed that leadership skills have the lowest reliability than other skills to measure key chef skills. But the overall reliability value of each indicator still has excellent grades and can measure the chefs' key competencies from the culinary students' perspective. This finding has important implications for developing chef competencies through education and training. Education and industry practitioners can use this questionnaire to evaluate the culinary achievement for students and chefs. Teachers can use this questionnaire to prepare the maturity of culinary student competencies in the chef profession, while HRD can use it for the career development of chefs.

6.   Conclusion

This study shows that culinary students' perceptions of chefs' key competencies can be explained by indicators of creativity, culinary expertise, hygiene & food safety, aesthetics, business sense, interpersonal, managerial, and leadership. The results of Aiken Vs' analysis to test the content validity show that the whole item (35 items) of the CKCQ has high validity to measure the chefs' key competencies. Furthermore, the pilot test contained two invalid items, namely 1 item on the aesthetic indicator (Aesth1) and 1 item on the interpersonal indicator (Inter1), so that the CKCQ questionnaire items totalled 33 items. Finally, the results of the CFA analysis to test the construct validity revealed that there were three invalid items (Creat4, Aesth2, and Manag5). So at this final stage CKCQ consists of 30 items consisting of creative (3 items), culinary expertise (5 items), hygiene & food safety (4 items), aesthetics (2 items), business sense (4 items), interpersonal (3 items), managerial (4 items), and leadership (5 items). All items (30 items) have good validity and reliability values.

7.   Limitation and Suggestion

This study involved culinary students as respondents to measure their perceptions of the chefs' key competencies. There is an assumption that culinary students do not yet have enough experience as a chef, thus allowing inaccuracies when filling out questionnaires. But we understand that they are prospective chefs who are being prepared through vocational education programs, so it is still relevant that they are involved as respondents. We suggest that future research involves chefs as respondents filling out the CKCQ questionnaire.

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