

# Chefs' perspectives on molecular gastronomy: Insights from İstanbul

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## Abstract

Molecular cooking is an innovative trend in the culinary world that utilizes new tools, ingredients, and techniques. Advances in molecular gastronomy attract a diverse audience, including the tourism sector, scientists, and food professionals. This study aims to explore the perspectives and attitudes of chefs who practice molecular gastronomy in the context of the evolving landscape of molecular cuisine. To achieve this, a survey was distributed to 413 chefs working in certified restaurants within tourism establishments in İstanbul. The findings revealed that 63% of the chefs consistently follow and adopt molecular cooking techniques, reporting that these methods enhance their culinary skills. The chefs expressed positive views regarding the application of molecular gastronomy, particularly in terms of perceived ease of use, usefulness, behavioral intentions, attitudes, and subjective norms. Among these dimensions, the strongest positive response was found in behavioral intentions. Furthermore, the chefs noted that foreign guests generally welcome molecular cooking, while local guests often show some resistance to these new culinary innovations. The study suggests that tourism managers should incorporate molecular foods into their menus and that academics should promote related literature through conferences and publications.

## Keywords

**Keywords:** Behavioral Intentions, Molecular Gastronomy, Perceived easy of use, Perceived usefulness, İstanbul.

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## Ethics & Conflict of Interest

### Conflict of Interest

The authors declare no conflict of interest.

### Ethics Approval

Not required for this study.

### Justification

The data were collected in 2018, prior to the implementation of mandatory ethics committee approval requirements.

## Author Contributions

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## Author Note

This article is based on a preliminary version presented as an extended summary at the International Congress of Gastronomy Research (20–22 September 2018). The present paper has been significantly developed with additional analyses, theoretical elaboration, and updated findings.

## Artificial Intelligence Usage Statement

The authors declare that no generative artificial intelligence or AI-supported tools were used at any stage of the preparation of this manuscript, including idea development, data collection, data analysis, text writing, language editing, or reference management. All academic, ethical, and legal responsibility for the content, analyses, interpretations, and conclusions of the article rests solely and entirely with the human authors.



## 1. Introduction

Molecular gastronomy, introduced in 1988 by French chemist Hervé This and Hungarian physicist Miklós Kürti, has significantly impacted food production methods, presentation, and flavor profiles, leading to major changes in gastronomy. This phenomenon is an intriguing trend in advanced food science and represents a modern approach to understanding culinary practices (This, 2006b). Molecular gastronomy is a science focused on the physical and chemical processes that food undergoes during preparation. According to This (2006a: 1062), it is defined as the "chemistry and physics behind the preparation of any dish." The goal of studying food preparation scientifically is to create healthier, more attractive dishes and to inspire more people to cook better (Cousins, O'Gorman, & Stierand, 2010). The insights gained from molecular gastronomy can transform traditional cooking methods, offering new aromas, flavors, appearances, textures, and overall culinary experiences (Chi, 2011). Essentially, it examines the conversion processes between food and cooking (Vega & Ubbink, 2008).

Molecular gastronomy captivates consumers with its unique and exciting cooking techniques. Research shows that consumers who prioritize practicality or pleasure are more likely to engage with enhanced food quality and enjoyable experiences provided by chefs (Liu, Feng & Hu, 2022). Given this trend, chefs are increasingly interested in creating visually appealing and intricately prepared dishes. They have started to adopt food preparation and cooking techniques that enable them to fulfill guests' evolving expectations. To achieve this, chefs have incorporated laboratory tools and materials from the food industry into their practices. Collaboration with scientists in chemistry and physics has played a significant role in the development of molecular gastronomy. These innovative techniques are primarily used to enhance customer interest and satisfaction. Additionally, the materials and methods employed in culinary applications have been approved by EU standards.

However, some individuals initially perceive molecular gastronomy as unhealthy, synthetic, chemical, or unnatural (Molecularrecipes, 2018). This study aims to explore the perceptions of chefs in Istanbul regarding molecular gastronomy and their willingness to adopt these new technologies and techniques. The significance of this study lies in its examination of chefs' perspectives on molecular gastronomy, which can encourage the development of high-quality culinary products and applications.

## 2. The molecular gastronomy phenomenon

Molecular gastronomy shifts the focus from traditional cooking techniques to the exploration of the physical and chemical processes involved in food preparation. This intriguing sub-discipline of food science merges elements of physics and chemistry to enhance the texture, flavor, and presentation of various foods, attracting both chefs and scientists. In this culinary field, liquids can be transformed into spheres, foams, and edible clouds, while flavors can be deconstructed and recombined in unexpected ways (Aguilera, 2005; Hyland, 2017).

Originating with physicist Nicholas Kurti and chemist Hervé This, molecular gastronomy extends beyond mere numbers and techniques, like the use of liquid nitrogen and spherification, which initially captured attention. It emphasizes understanding the science behind food and its behavior. For example, it investigates why a soufflé rises, how emulsions remain stable, and what makes a steak juicy (Chang et al., 2025). Additionally, it addresses subjects such as heat transfer to foods in ovens, the use of scientific instruments in the kitchen, and novel techniques like vacuum cooking. Molecular gastronomy advocates that meals should be examined not just as art but also through the lens of science.

In recent years, innovative cooking shows on visual media, such as *MasterChef* (Tv8, 2025), *Marcel's Quantum Kitchen* (Syfy, 2011), *In Search of Perfection* (BBC, 2007), and *Kitchen Chemistry* (Discovery Channel, 2012), have contributed to a growing interest in a more refined food culture. The rapid growth of social media, combined with an increasing number of people sharing their culinary experiences online, has further propelled the recognition of molecular gastronomy. However, some individuals remain hesitant about the health implications of molecular foods. As illustrated in the accompanying image (Image 1), the chef prepares and presents dishes that create a visual spectacle using molecular gastronomy, reflecting the dynamic changes in the tourism sector.



**Image 1: Molecular Applications**

*Source: Molecular presentations by Chef Erdem Dirbali (Permission is given by the chef)*

Hervé This noted that molecular cooking is a culinary trend that incorporates 'new' tools, ingredients, and methods. Molecular gastronomy leverages scientific discoveries and encourages creativity to produce different flavors and appearances. Blanck (2007: 82) offers a contrasting perspective, arguing that molecular gastronomy is often misunderstood as merely a cooking trend or a collection of cooking techniques. This confusion may stem from chefs successfully adopting tools and methods typically associated with the sciences rather than traditional culinary arts. However, developments in this area suggest that the trend will continue to evolve. Chefs are committed to innovation and are actively implementing various techniques in their kitchens. These include controlled-temperature heating using water baths (*sous vide* cooking), vacuum cooking and impregnation, freezing and grinding with liquid nitrogen, gelation (spherification), creating edible films, and high-power mixing (Marx & Haumont, 2016; Aguilera, 2017).

Some basic techniques introduced by molecular gastronomy, which are now used by many chefs, include:

*Spherification*: This process transforms safe-to-drink liquids into gel-like spheres that burst in your mouth, such as "caviar" made from fruit juice.

*Emulsification*: This technique involves mixing immiscible liquids, like oil and water, to create stable mixtures, such as modernist mayonnaise.

*Sous-vide*: This method entails cooking foods in vacuum-sealed bags at low temperatures to maintain their consistent texture.

*Foamers and airs*: This technique utilizes gelling agents or siphons to create light, airy textures from liquids.

These innovative methods enhance culinary experiences and allow chefs to experiment with flavors and textures in unique ways. Molecular gastronomy is thought to be related to health in the near future. The use of science and technology to improve cooking may help to solve healthy eating and appetite problems. The different appearance and presentation of the molecular cooking can be welcomed positively by the people suffering from anorexia. It may be preferred because of the potential to encourage food consumption in children, patients and in the elderly (Linden et al., 2008).

### *The Perception of Chefs on Molecular Gastronomy*

The benefits of molecular gastronomy can be observed across various professions, with chefs being the most significant beneficiaries. They can enhance their menus, recipes, and presentations through techniques of molecular gastronomy. Despite the changing opinions about this culinary approach, chefs generally view it as a complementary aspect of the culinary arts (Akoğlu et al., 2017).

Chefs identify several key factors that contribute to a successful culinary career and reputation: a willingness to develop and adapt, a deep understanding of ingredients and their relationships, a clear vision, and an appreciation of diverse culinary cultures. While they acknowledge that molecular gastronomy alone may not serve as the foundation for lasting culinary development, they recognize that it fosters a fascination with the fundamental science and techniques behind cooking, as well as the art of culinary transformation.

Seal et al. (2022) explore the perceptions of chefs working in luxury hotels regarding molecular gastronomy. They note that chefs previously had limited acceptance of molecular practices and techniques. However, today's food enthusiasts are more open to new culinary trends. Many chefs believe that dishes created using molecular gastronomy will gain broader acceptance in the future, positively influencing the evolution of dining experiences.

Cousins et al. (2010) caution that poor-quality copycat chefs can damage the reputation and practices of pioneers in molecular cuisine innovation. The chemical elements and laboratory techniques employed in molecular gastronomy require not only technical knowledge but also practical skills. Chefs also consider the ease of applying molecular cuisine techniques. Given this literature, the following hypotheses are proposed in this study:

**Hypothesis 1:** *A chef's perceived ease of use positively affects their attitude toward molecular gastronomy.*

Contemporary trends in molecular cooking have chefs focused on combining individual ingredients to create specific shapes, colors, flavors, aromas, temperatures, textures, and nutritional profiles, often avoiding traditional items like meat, fish, vegetables, or fruit. Chefs utilize tools such as siphons and sodium alginate to achieve these effects. Additionally, rotary evaporators are employed to extract flavor compounds, while transglutaminase is used in various culinary preparations, allowing chefs to develop innovative techniques that result in unique dishes with distinct textures and flavors. Moreover, many chefs believe that the usefulness of molecular techniques provides an opportunity to educate the public about cuisine and cooking by employing creative food processing methods and scientific principles (Fooladi et al., 2019; Manoj J & Venkatraman, 2025). From this perspective, the following hypotheses have been proposed:

**Hypothesis 2:** *A chef's perception of usefulness positively affects their attitude toward molecular gastronomy.*

**Hypothesis 3:** *The higher the ease of use that chefs perceive, the greater their perceived usefulness will be.*

Chefs' attitudes and norms regarding molecular gastronomy can vary significantly (Adhianata et al., 2023). A chef's level of education, experience, and nutritional knowledge greatly influence their perspective on molecular gastronomy. Many chefs believe that the techniques associated with molecular gastronomy often require expensive equipment, such as sous vide machines, liquid nitrogen tanks, centrifuges, and 3D food printers. This equipment is not easily accessible to all chefs or home cooks. Additionally, specialized materials like hydrocolloids, aerogels, and encapsulated compounds tend to be much more expensive than traditional ingredients, making molecular cuisine less attainable for the average consumer. For example, chefs in small restaurants may struggle to adopt molecular gastronomy due to the financial burden of acquiring advanced tools and the necessary training for their use. As a result, various circumstances may affect their willingness to explore these modern cooking techniques (Akoğlu et al., 2017; Manoj J & Venkatraman, 2025). In light of these challenges, the study proposes the following hypotheses:

**Hypothesis 4:** *The higher a chef's attitude toward molecular gastronomy, the greater their behavioral intention to adopt it.*

**Hypothesis 5:** *The stronger the subjective norm among chefs regarding molecular gastronomy, the greater their behavioral intention to embrace it.*

In addition to these issues, a chef's perceived benefits from molecular gastronomy may also act as a mediating variable between perceived ease of use and attitudes. Based on this perspective, the final hypothesis of the study is formulated as follows:

**Hypothesis 6:** *A chef's perceived usefulness of molecular gastronomy mediates the relationship between perceived ease of use and attitude.*

Molecular gastronomy may enable food producers to maintain high quality while exploring cost-effective alternatives and extending the shelf life of products. It also creates innovative dishes and can promote healthier eating habits. Furthermore, it has the potential to revive traditional cooking practices that are becoming less common in many communities (Yılmaz & Bilici, 2013).

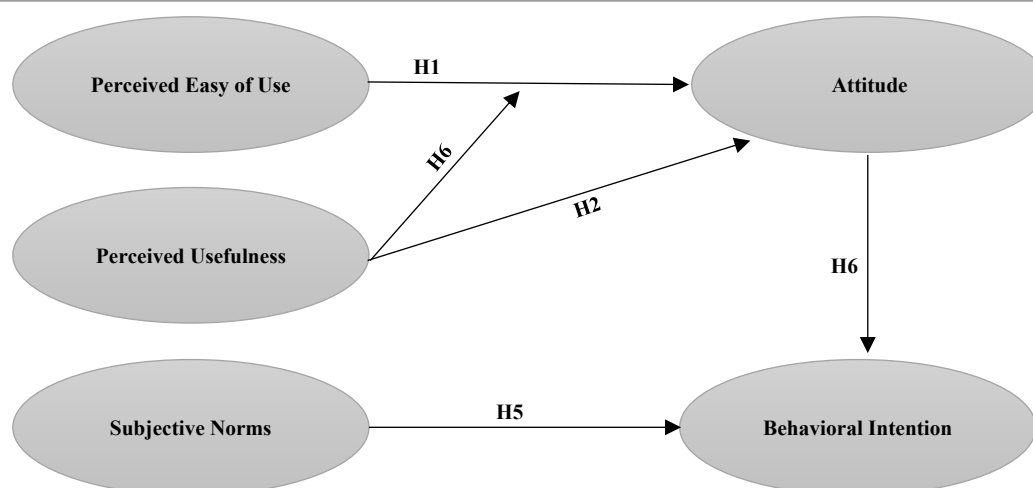


Figure 1. Conceptual Model

Source: Authors' own elaboration

### 3. Methodology

The study employed quantitative methods in its design, utilizing convenience sampling as a non-probability sampling technique. This method involves selecting participants based on their easy availability and accessibility, allowing researchers to choose sampling units with minimal effort. Convenience sampling is preferred for its low cost and ease of access, especially when time constraints are a concern. This approach is particularly effective for reaching hard-to-access populations, such as kitchen workers (Camillo & Pietro, 2015: 23). It was chosen to account for these variables while aiming for generalizability; the goal is to ensure that the findings accurately reflect the broader population from which the sample was drawn (Etikan, Musa, & Alkassim, 2016).

### 4. Sampling process

The fieldwork for this study was conducted in Istanbul, selected as a premier destination for gastronomy tourism due to its rich history, diverse cuisine, and numerous tourist attractions. Tourism in the city transcends merely visiting historical sites; it encompasses a variety of experiences in local gastronomy, art, shopping, and nightlife (Şahin & Ünver, 2015). Notable landmarks, such as the Hagia Sophia, Topkapı Palace, and Sultanahmet Mosque, are designated UNESCO World Heritage sites and serve as significant symbols of the city's rich cultural heritage. According to data from the Turkish Ministry of Culture and Tourism (2018), there are 194 first-class restaurants in Istanbul with tourism investment certificates (25 restaurants) and tourism operation certificates (169 restaurants). These establishments have a total capacity of 91,937 people (KulturTurizm, 2018). Most of the chefs working in these restaurants are employed full-time.

Churchill and Surprenant (1982) recommend a sampling method that begins with conducting a pilot study, which involves collecting data, refining measures, collecting new data, and assessing reliability and validity. A pilot study of the survey was conducted with a group of 82 participants (47 female and 35 male chefs) who agreed to take part in the research. Participants were asked to complete the survey and provide feedback on its relevance, clarity of wording, item ordering, and any suggestions they might have. This phase led to the paraphrasing of several ambiguous sentences.

Sekaran (1992: 253) outlines acceptable sample sizes for different populations, specifying that for a population of 100,000 or more, a sample size of 382 participants is sufficient. Following this guideline, a total of 610 survey forms were distributed by hand throughout Istanbul. After excluding missing or invalid responses, analyses were conducted using the 413 completed surveys.

### 5. The Design of Questionnaires

A questionnaire was developed and validated to explore the hypothesized relationships using Structural Equation Modeling (SEM) with AMOS software. AMOS was chosen because it estimates parameters using full-information maximum likelihood, which is particularly effective in managing missing data. This approach avoids the drawbacks associated with listwise or pairwise deletion and mean imputation. AMOS, which enhances covariance-based SEM, was selected for this analysis due to its effectiveness in assessing measurement reliability, convergent validity, and discriminant validity (Hair et al., 2019).

The survey used in this study focuses primarily on the “Molecular Gastronomy Message Acceptance” construct, designed by Chi (2011). Chi compiled the five dimensions of this scale from the literature (Ajzen, 1985, 1988, 1991; Davis et al.,

1989; Fishbein & Ajzen, 1975; Venkatesh & Davis, 2000) and applied it to students in the food and beverage department at a university in Southern Taiwan.

Cronbach's Alpha ( $\alpha$ ) coefficient was calculated to assess the reliability and internal consistency of the scales utilized in the study. In this analysis, the Cronbach's Alpha ( $\alpha$ ) coefficient for each factor was found to be above 0.80. Additionally, convergent and discriminant validity were examined using Average Variance Extracted (AVE) and Composite Reliability (CR) for validity assessments. According to Hair et al. (2019), the AVE must be greater than 0.5, and the CR must exceed 0.7. The CR and AVE values provided evidence of convergent validity.

To reduce the risk of common method variance and potential bias, several measures were implemented. Following the recommendations of Park et al. (2024), all participants were informed that there were no "right" or "wrong" answers to the survey items, and that their responses would remain anonymous. Additionally, all English-based measures were translated into Turkish using the "translation/back-translation" procedure. Measurements were conducted using Likert-type scales. To further enhance data quality, reverse attention check questions were included in the survey.

The questionnaire for this study is divided into three sections. The first section focuses on gathering general opinions from chefs regarding molecular gastronomy. The questions in this section include:

- Do molecular cooking techniques make the chef's job more or less skillful?
- Does molecular cooking contribute to the commercial success of businesses?
- How do local and foreign guests perceive molecular preparation and cooking techniques?

The second section addresses the construct of "Molecular Gastronomy Message Acceptance." The third section consists of six questions aimed at collecting basic information about the survey respondents. This includes questions about gender, age, level of tourism education, length of time working for their current employer, professional experience as a chef, and familiarity with food preparation and presentation techniques related to molecular gastronomy.

**6. Research Results**

The study found that the data followed a normal distribution, allowing for the use of parametric tests. This conclusion was based on several factors: the sample size was greater than 30, the measures of central tendency (mode, arithmetic mean, and median) were similar, and the skewness and kurtosis values (-0.947 and +0.342, respectively) fell within the range of +1.500 to -1.500 (Tabachnick & Fidell, 2013). Firstly, the demographic characteristics of the participants and their responses to open-ended questions are presented.

**Table 1. Findings Related to the Demographic Characteristics of the Participants (N=413)**

		<b>Number</b>	<b>%</b>
Gender	Male	310	75
	Female	103	25
Age	20-25	41	10
	26-35	159	38.4
	36-45	114	27.6
	46-55	73	17.7
	56 and over	26	6.3
Degree of tourism education	Basic tourism courses	49	11.9
	High School	261	63.2
	University	103	24.9
Experience as a Professional Chef	1-3 years	63	15.2
	4-6 years	128	31
	7-9 years	142	34.4
	10 and over	80	19.4
Food Preparation/ Presentation about Molecular Gastronomy	I prepared and presented a meal with molecular gastronomy.	88	21.3
	I constantly use molecular cooking and presenting techniques.	260	63
	I did not prepare food with molecular gastronomy and not make any presentation.	65	15.7

*Source: Authors' own elaboration*

According to Table 1, the majority of participants (75%) are male chefs. No data has been found to determine the gender of chefs working in restaurants in Istanbul. However, academic studies examining Istanbul chefs indicate that the majority of chefs are male (Çetinkaya, 2025:441). While this suggests that there may be more male representation in the sector, it also indicates that women are actively involved in this field. A significant portion of these chefs, 76%, falls within the age range of 20 to 45 years old. Additionally, most have received their education at tourism high schools, accounting for 63% of the respondents. The data also reveals that 65% of these chefs have been working as professionals for 4 to 9 years. Furthermore, 63% of the chefs regularly utilize molecular cooking techniques and presentation styles in their work.

**Table 2. Findings Related to General Opinions of Chefs (N=413)**

Do molecular cooking techniques make the job more or less skillful?	<b>More</b>	<b>%</b>	<b>Less</b>	<b>%</b>	<b>Neutral</b>	<b>%</b>						
	348	84.3	45	10.9	20	4.8						
Does molecular cooking bring commercial success to businesses?	<b>Yes</b>	<b>%</b>	<b>No</b>	<b>%</b>	<b>Neutral</b>	<b>%</b>						
	299	72.4	50	12.1	64	15.5						
How do the local/ foreign guests perceive the molecular preparation and cooking techniques?	<b>Positive</b>				<b>Negative</b>				<b>Neutral</b>			
	<b>Local Guest</b>	<b>%</b>	<b>Foreign Guest</b>	<b>%</b>	<b>Local Guest</b>	<b>%</b>	<b>Foreign Guest</b>	<b>%</b>	<b>Local Guest</b>	<b>%</b>	<b>Foreign Guest</b>	<b>%</b>
	98	23.7	220	53.3	69	16.7	11	2.7	8	1.9	7	1.7

Source: Authors' own elaboration

The vast majority of the chefs (%84.3) have commented that the molecular cooking has developed their skills. Besides, the chefs indicated that molecular cooking bring commercial success (%72.4) to the restaurants. The chefs revealed that molecular cookings were welcomed by the foreign guests (%53) whereas local guests shown some resistance (%16.7) to the chefs introductions.

## 7. Confirmatory Factor Analyses

A Confirmatory Factor Analysis (CFA) is first used to confirm the factor loadings of the construct (i.e. Perceived ease of use, perceived usefulness, attitude, subjective norms and behavioral intention) and to assess the model fit. After that the reliability analysis of each dimension is examined. The model adequacy was assessed by the fit indices suggested by Hair et al. (1998). The CFA analysis showed that the the goodness of fit indexes are within the acceptable limits ( $X^2= 239.76$ ,  $df= 82$ ;  $X^2/df= 2.92$ ;  $P < 0.002$ ;  $GFI = 0.92$ ,  $AGFI = 0.91$ ,  $RFI = 0.94$ ,  $NFI = 0.93$ ,  $NNFI = 0.92$ ,  $CFI = 0.90$ ,  $RMSEA = 0.06$ ). Convergent validity of CFA results should be supported by item reliability, construct reliability, and average variance extracted (Hair et al., 1998). Cooper and Schindler (2003) suggested that a value of Cronbach's Alpha greater than 0,8 indicates high internal reliability. It is seen that the results of this construct are in high-reliability values.

**Table 3. The Mean of the Constructs and Results of Confirmatory Factor Analyses (Convergent validity)**

Constructs/ Items	Mean	S. factor loading	S. Error	t-value	C.R.	A.V. E.
<b>Perceived Ease of Use (mean= 3.72) <math>\alpha = .91</math></b>						
I consider that it is easy to use molecular gastronomy for food's seasoning.	3.70	0.90	0.02	24.69**	0.92	0.84
I consider that it is easy to use molecular gastronomy for food's cooking.	3.84	0.82	0.02	20.78**		
I consider that it is easy to use molecular gastronomy technology	3.64	0.84	0.03	21.32**		
<b>Perceived Usefulness (mean= 3.90) <math>\alpha = .93</math></b>						
I believe that molecular gastronomy technology can create a brand new smell and taste food.	3.94	0.77	0.02	19.44**	0.82	0.62
I believe that molecular gastronomy technology can produce tasty food and receive consumers' surprising responses.	4.02	0.72	0.04	18.14**		
I believe that molecular gastronomy technology is very particular on food's taste.	3.78	0.88	0.02	23.06**		
I believe that molecular gastronomy technology is very particular on food's seasoning.	3.80	0.85	0.02	22.56**		
I believe that food seasoned by molecular gastronomy technology is very delicious.	3.94	0.78	0.02	19.84**		
<b>Attitude (mean= 4.12) <math>\alpha = .91</math></b>						
I enjoy food seasoned by molecular gastronomy technology.	3.98	0.71	0.04	17.42**	0.94	0.84
I enjoy cooking food with molecular gastronomy technology.	4.28	0.89	0.02	23.34**		
I enjoy food's brand new taste created by molecular gastronomy technology.	4.12	0.76	0.04	18.28**		
I enjoy molecular gastronomy technology in particular on food's tasty	4.08	0.86	0.02	23.12**		
<b>Behavioral intention (mean= 4.30) <math>\alpha = .90</math></b>						
I will invite my colleagues and my guests to taste food seasoned by molecular gastronomy technology.	4.14	0.83	0.02	21.26**	0.84	0.62
I will accept new technic and food by molecular gastronomy technology	4.48	0.66	0.02	16.02**		
I am willing to taste food cooked by molecular gastronomy technology.	4.30	0.89	0.04	22.86**		
<b>Subjective Norms (mean= 3.80) <math>\alpha = .89</math></b>						
Advertisements on TV, internet, newspaper or magazine will affect me to try and taste food seasoned by molecular gastronomy technology.	4.10	0.81	0.02	18.04**	0.82	0.60
I will taste food and try to cook the food seasoned by molecular gastronomy technology if my friends and colleagues (chefs) tastes food seasoned by molecular gastronomy technology first.	3.52	0.67	0.03	16.10**		
I will taste food and try to cook the food seasoned by molecular gastronomy technology from time to time by fashion trend.	3.80	0.73	0.02	17.81**		

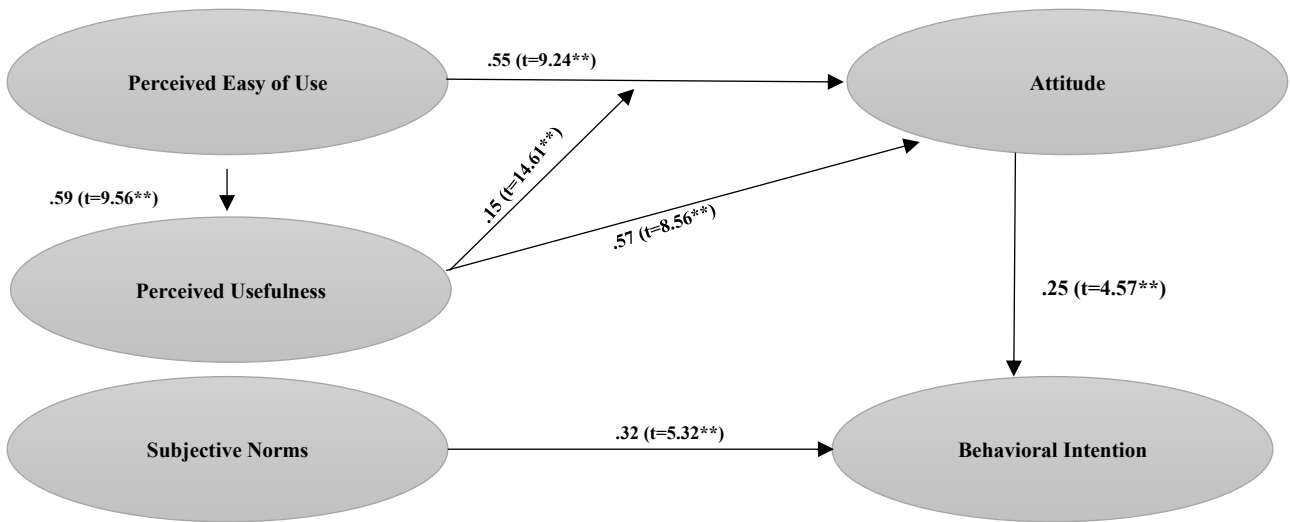
\*\* $p < 0.01$ . Likert-type scale 1 strongly disagree...5 Strongly agree.

Source: Authors' own elaboration

The chefs in the study pointed out that they participate all expressions in construct. The highest chosen dimension for participation is behavioral intention ( $\bar{X} = 4.30$ ). Furthermore, the highest chosen expression ‘I will accept new technic and food by molecular gastronomy technology’ for participation ( $\bar{X} = 4.48$ ) is under behavioral intention. T-values for all the standardized factor loadings of items are found to be significant ( $p < 0.01$ ). At the same time, construct reliability estimates ranging from 0.82 to 0.94, which exceed the critical value of 0.7, indicating a satisfactory estimation. The AVE (Average Variances Extracted) of all dimensions range between 0.60 and 0.84 which are above the suggested value of 0.5. These results in general demonstrate that the model has good convergent validity. Thus, the hypothesized model is reliable and after this findings the relationships and effects between these constructs can be measured.

**8. Hypothesis tests**

The structural model is estimated with a maximum likelihood estimation method and the goodness of fit indexes that make up the model are within acceptable limits ( $X^2= 310.58$ ,  $df= 98$ ;  $X^2/df= 3.17$ ;  $P < 0.008$ ;  $GFI = 0.91$ ,  $AGFI = 0.90$ ,  $RFI = 0.91$ ,  $NFI = 0.91$ ,  $NNFI = 0.90$ ,  $CFI = 0.90$ ,  $RMSEA = 0.05$ ). The results indicate that the structural coefficients provide the basis for testing the proposed hypotheses. The parameters and related t values resulting from the structural equation analysis shown in Figure 2. and Table 4 shows direct, indirect and total effects of the paths and the results of the hypothesis.



$**p < 0.01$ .

**Figure 2. Summarizes the Parameter Estimates for the Model (t values in parentheses).**

Source: Authors' own elaboration

All the hypotheses supported by the analysis results. Perceived ease of use has a significant positive effect on both perceived usefulness and attitude ( $\beta = 0.59$ ,  $t = 9.86$  and  $\beta = 0.55$ ,  $t = 9.24$ , respectively). Perceived usefulness has a significant positive effect on attitude ( $\beta = 0.57$ ,  $t = 8.56$ ).

**Table 4. Direct, indirect and total effects of relationships.**

Path	Direct effect	Indirect effect	Total effect	Test result
H <sub>1</sub> : Perceived usefulness → Attitude	0.57	-	0.57	Support
H <sub>3</sub> : Perceived ease of use → Perceived usefulness	0.59	-	0.59	Support
H <sub>4</sub> : Attitude → Behavioral Intention	0.25	-	0.25	Support
H <sub>5</sub> : Subjective norm → Behavioral Intention	0.62	-	0.62	Support
H <sub>2</sub> , H <sub>6</sub> : Perceived ease of use → Attitude (H <sub>6</sub> : Perceived usefulness as a mediator)	0.55	0.15	0.70	Support
	CI: 0.072 - 0.198			

Note: Standardized regression coefficients are reported. CI = Confidence Interval.

Source: Authors' own elaboration

The results indicate that attitudes significantly and positively influence the behavioral intentions of the chefs, with a standardized path coefficient of  $\beta = 0.25$  and a t-value of 4.57. Additionally, subjective norms among the chefs also have a positive effect on their behavioral intentions, evidenced by a  $\beta$  of 0.32 and a t-value of 5.32. Furthermore, perceived usefulness acts as a partial mediator between perceived ease of use and attitude, with a total  $\beta$  of 0.70 and a t-value of 14.61. The 95% confidence interval (CI) for this relationship is [0.072 - 0.198], which does not include the value of zero. Based on these findings, the H2 and H6 hypotheses are supported.

## **9. Discussion and suggestions**

Istanbul, a city straddling both Europe and Asia, has a rich culinary heritage rooted in Ottoman and Anatolian traditions. This diverse culinary landscape features a variety of dishes, including kebabs, baklava, and Mediterranean meze. In recent years, the food scene in Istanbul has evolved, with chefs increasingly experimenting with modern techniques, particularly molecular gastronomy.

Molecular gastronomy, pioneered by renowned chefs, utilizes tools such as liquid nitrogen, sous-vide equipment, and spherification to transform textures and flavors. This innovative approach creates dining experiences that are both theatrical and culinary. Chefs in Istanbul view molecular gastronomy as an opportunity for innovation while also seeking to maintain a balance with traditional Turkish cuisine. With Istanbul's recognition as a global culinary destination—home to Michelin-starred restaurants like Neolokal and Mikla—chefs have embraced molecular techniques to enhance local ingredients such as sumac, pomegranate molasses, and Anatolian cheeses.

For instance, a chef might use spherification to encapsulate olive oil or create foams to reinterpret classic dishes like tzatziki, a yogurt and cucumber dish, merging traditional flavors with avant-garde techniques. According to the findings of this study, approximately 84% of participating chefs have experimented with molecular cooking, and 63% of these chefs consistently adopt concepts from molecular gastronomy.

As noted by Cousins, O'Gorman, and Stierand (2010), becoming a great chef requires mastering technical skills along with a deep understanding of molecular gastronomy. The majority of chefs in this study shared this perspective, indicating that molecular cooking techniques enhance their skill set. While chefs mentioned that foreign guests generally receive molecular cooking well, local diners tend to be more resistant to these techniques, suggesting that they remain somewhat traditional in their dining preferences. Nevertheless, the chefs believe that molecular cooking contributes to the commercial success of their businesses in Istanbul and enhances their skills through acquiring knowledge and utilizing specialized equipment.

This study investigates chefs' perceptions using Chi (2011)'s construct, 'Molecular Gastronomy Message Acceptance.' The results showed that chefs expressed positive views across various dimensions, including perceived ease of use, perceived usefulness, behavioral intentions, attitude, and subjective norms. Among these dimensions, 'behavioral intentions' received the strongest positive response. The three components defining 'behavioral intentions' relate to chefs' willingness to recommend molecular gastronomy techniques to others, as well as their intent to use and taste molecular cuisine. Given the economic implications of molecular gastronomy, this study emphasizes the importance of the 'behavioral intentions' dimension for business success.

This study demonstrates that chefs' attitudes toward molecular gastronomy are positively influenced by their perceived ease of use and usefulness of molecular cooking techniques. Additionally, the reactions of diners likely impact these attitudes. Istanbul's diverse population and the influx of international visitors create an audience that is open to culinary innovation, although there is still a strong cultural attachment to familiar flavors. As a result, chefs can adapt molecular gastronomy to align with local tastes, using it more as a novelty rather than making it the main focus of their menus. For example, a dessert featuring Turkish delight chilled in liquid nitrogen may attract tourists while still honoring tradition.

Chefs find the technology associated with molecular gastronomy easy to use and beneficial, leading to a positive shift in their attitudes. Consequently, they are more inclined to engage in molecular cooking and experiment with new techniques. Moreover, when chefs have stronger subjective norms—shaped by influences such as advertisements, promotions, friends, and colleagues—they are more likely to develop an intention to explore molecular gastronomy. Therefore, promoting trends in molecular gastronomy, particularly those that appeal to foreign tourists, alongside creative examples showcased in the media, can increase chefs' interest in this area. Food and beverage providers and managers should support the inclusion of molecular dishes on their menus, organize demonstrations, and facilitate conferences related to this innovative culinary field.

### **Limitations and Future Research**

This study was conducted in Istanbul, and its findings may have limited generalizability to similar regions, as results could vary in different cultural contexts. Future research could expand this study to other locations to assess how applicable the findings are across diverse settings. The research is based on questionnaire data collected from first-class restaurant businesses, making the evaluations specific to Istanbul. Applying these findings to other restaurants and hotel enterprises could enhance their generalizability. While this study included open-ended questions, future research would benefit from conducting in-depth interviews to explore chefs' perspectives in greater detail and to better understand the scope and nature of their expertise in molecular gastronomy.

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