Designing a competency model for managers of health care networks in Iran

Diseño de un modelo de competencias para gestores de redes sanitarias en Irán

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Abstract

Objective: One of the basic pillars of the organizational development and excellence is the existence of competent managers at different levels of management. This study aimed to design a native model to determine the competencies of managers in the Iranian health care network.

Methods: The present study was a combined study using the quantitative-qualitative methodology. In the qualitative part, 14 experts of the country's health network were selected by purposive sampling method, and in the quantitative part, 184 managers of country's health networks were selected based on multi-stage cluster sampling method. The research tool is a semi-structured interview in the qualitative part of interviews and a researcher-made questionnaire in the quantitative part. To test and validate the appropriate model, the competency model of AMOS software was used.

Results: The results of qualitative part showed that the dimensions and subscales of competency model are as follows: basic competencies with two components of personality traits (19 indices) and individual skills (22 indices); Managerial competencies with two components of managerial abilities (11 indices) and managerial skills (16 indices). The results of quantitative part explained the competency model well by performing the first, second, and third-order confirmatory factor analysis of each of the main and sub-dimensions and indices.

Conclusion: The competency model designed in this study can be used in the field of selecting managers of health and treatment networks in the country by considering localization, educational needs assessment, redefining the performance evaluation system, optimizing the career path management system, etc.

Keywords: Manager, health network, competency model, confirmatory factor analysis.

Resumen

Objetivo: Uno de los pilares básicos del desarrollo y la excelencia organizacional es la existencia de gerentes competentes en los diferentes niveles de gestión. Este estudio tuvo como objetivo diseñar un modelo nativo para determinar las competencias de los gerentes en la red de atención médica iraní.

Métodos: El presente estudio fue un estudio combinado utilizando la metodología cuantitativa-cualitativa. En la parte cualitativa, se seleccionaron 14 expertos de la red de salud del país mediante el método de muestreo intencional, y en la parte cuantitativa, se seleccionaron 184 administradores de las redes de salud del país con base en el método de muestreo por conglomerados de etapas múltiples. La herramienta de investigación es una entrevista semiestructurada en la parte cualitativa de las entrevistas y un cuestionario elaborado por el investigador en la parte cuantitativa. Para probar y validar el modelo apropiado, se utilizó el modelo de competencia del software AMOS.

Resultados: Los resultados de la parte cualitativa mostraron que las dimensiones y subescalas del modelo de competencia son las siguientes: competencias básicas con dos componentes de rasgos de personalidad (19 índices) y habilidades individuales (22 índices); Competencias gerenciales con dos componentes de habilidades gerenciales (11 índices) y habilidades gerenciales (16 índices). Los resultados de la parte cuantitativa explicaron bien el modelo de competencias al realizar el análisis factorial confirmatorio de primer, segundo y tercer orden de cada una de las principales y subdimensiones e índices.

Conclusión: El modelo de competencias diseñado en este estudio puede ser utilizado en el campo de la selección de gerentes de redes de salud y tratamiento en el país considerando la localización, evaluación de necesidades educativas, redefiniendo el sistema de evaluación del desempeño, optimizando el sistema de gestión de carrera, etc.

Palabras clave: Gerente, red de salud, modelo de competencia, análisis factorial confirmatorio.

Introduction

Intense competition and rapid growth, and continuous technological changes put increasing pressure on organizations and their various methods to improve the productivity of human resources. Among these, the role of managers of organizations is very important[1]. Because of their position, managers can bring valuable successes and reciprocal regrets to the institution under their supervision. They play an important role in the evolution and excellence of the organization via the strategic planning, resource allocation, organizing people, leadership and performance management, and evaluation and control. Organizations strive to compete with the most competent managers as a competitive advantage, identification, absorption, and retaining[2].

Therefore, World Health Organization has emphasized the importance of management and leadership in health care centers that the issuance of statements, emphasis on the words of management in naming the year, the publication of tens of volumes of guidelines for health system managers are among the cases confirming this[3]. Health care organizations with dynamic, complex, and vulnerable environments need managers who have the necessary competencies to direct the organizational behavior of health care team members. By efficient and effective management, health care organizations have led to a change in approach from the professional bureaucracy model to the managerial competency model[4]. To increase the independence and competence of managers and employees, health care organizations should develop measures related to human resource management (HRM)[5].

The county health network, as the first staff organization of the Ministry of Health in the environmental layers, as the largest organization in charge of health in the country and also the second organization due to the number of manpower and organizational units, has characteristics which distinguish it from many organizations and these characteristics are mainly related to various health programs and sensitive and key prevention and treatment missions that all members of society need.

The existence of public hospitals in the county, several thousand comprehensive centers of rural and urban health services, many of which are 24 hours a day, maternity facilities, disease counseling centers, and more than several thousand health centers in all parts of the country confirms the importance of health system management system of the county. However, the system of selection and appointment of managers of the county health network is traditional and mainly emphasizes the responsibility and management of general practitioners. Not learning management principles and skills before or during management, intermittent withdrawal of physicians from the health system due to continuing education or preference to work in purely medical and private wards

and lack of a continuous monitoring and evaluation system, in addition to managerial weakness and waste of resources, has led to lack of motivation of other specialized forces. Due to the lack of forecasting and inclusion of management disciplines in compiling the conditions to obtain managerial positions in the health care network and by examining the biographies of managers on the website of medical universities, it can be seen that the number of managers with higher education history in health care management system in the network management system of the whole country is very limited while the vast majority of them were selected from general practitioners. Using a system of recruitment and selection of managers based on competence can greatly help the performance of the health system in meeting the challenges and address the issues arising from managerial weaknesses in this area. Therefore, identifying the key competencies for selecting, training, and developing health care network managers is absolutely essential.

Despite numerous studies in the field of identifying the competencies of managers and presenting different models and frameworks, most of them have not achieved a coherent and comprehensive framework of competencies[6]. Therefore, this study was conducted to design and compile a local competency model for county health network managers in Iran.

Research method

In the present study, which was conducted in 2021, a combined (quantitative-qualitative) methodology was used. The statistical population of qualitative section included expert faculty members, managers of the country's health care network, and the best and most knowledgeable experts of the country's health care network. The research sample was selected by the purposive sampling method who entered the study. 14 people, including 6 professors, 5 managers, and 3 experts participated in the study purposefully and according to the rule of theoretical saturation and voluntarily. Criteria to select university professors to enter the interview, included having books and articles in the field of educational management, managerial competencies, innovation and creativity in education and management, and history of giving lectures in scientific circles and meetings in the field of education and management in the country's health networks. The criterion to select the best managers and experts was the introduction of managers and experts and the sample introduced by the Deputy Minister of Education and training experts of the country's health networks. In addition to the purposiveness of the sampling method, the snowball technique was also used, and the interviewees were asked to identify people who can provide us with appropriate quality data in this regard. Since semi-structured interviews were used in the qualitative stage of this study, in order to analyze the data obtained from the interview, the three-step

coding method of Strauss and Corbin (1998) was used as open, axial, and selective coding. In qualitative data analysis, the following steps were followed: 1) data review, 2) data organization, 3) data coding, 4) data classification, 5) creation of subcategories, 6) creation of main categories or major axes, and 7) report compilation.

In the second stage of research, after conducting qualitative research and making a questionnaire, a quantitative method was used to test the proposed competency model of country's health care network managers. The purpose of this stage of the research is to determine complex patterns of relationships, test the extent of relationships among categories, and achieve levels of generalizability in the larger sample. In this stage, descriptive-analytical research method and structural equation modeling were used. The statistical population of quantitative research includes 905 managers of the country's health care network in 2021. In the present study, in the first step, the multi-stage cluster sampling method was used, and in the second step, the sampling method proportional to the volume was used. To determine the sample size, the Cochran sampling formula was used, and 184 samples were determined. After receiving the information of the questionnaire, due to non-response and distortion of some of them, 179 questionnaires were finally analyzed. A researcher-made questionnaire was used to collect data in a quantitative stage. The basis for making the questionnaire is the indices identified in the qualitative stage of the research. The questionnaire of the present study was designed and implemented according to the 5-point Likert scale. The final model was in the form of 90 indices in 3 dimensions of basic competencies, managerial competencies, specialized competencies so that the basic competencies include two components with personality traits (19 indices) and individual skills (22 indices); Managerial competencies with two components of managerial abilities (11 indices) and managerial skills (16 indices); Furthermore, the index of specialized competencies is with two components of specialized knowledge (15 indices) and specialized experience (7 indices). Descriptive and inferential statistical methods were used to analyze the data. In the descriptive statistics part, mean and standard deviation and in the inferential statistics part, first and second-order confirmatory factor analysis by helping AMOS software and also univariate and correlated t-test by helping SPSS25 software were used.

Analysis of findings

The results of the first stage of Delphi removed 14 indices from 104 indices, added 3 indices, merged 2 indices into 1, and also modified 7 indices. The second round was performed with 90 indices. In the second round, the average of all sub-indices was higher than 4 and no sub-index was removed or added, and the third round was repeated with the same 90 indices along with the average comments of members. Based on

this, the competency model of the country's healthcare network managers was extracted in three stages. The first stage consists of 3 general dimensions, which are: the dimension of basic competencies, the dimension of managerial competencies, and the dimension of specialized competencies. The second stage consists of 6 components: personality traits, individual skills, managerial abilities, managerial skills, specialized knowledge, and specialized experience, and the third stage of the model includes 90 competency indices of the country's health network managers, which are shown in **table I**. The result of qualitative analysis is presented.

After the findings of qualitative results, in the quantitative part, in order to explain and evaluate the validity of the competency measurement model of the country's health care network managers, the reliability index (Cronbach's alpha coefficient) and first, second and third-order confirmatory factor analysis was used, which is as follows. **Table II** shows the reliability of the dimensions and subscales of the competency model of the country's health care network managers using Cronbach's alpha coefficient index.

The results of the reliability coefficient using Cronbach's alpha coefficient in **table II** show that for the dimensions and subscales of the competency model of the country's health care network managers, the reliability rate is between 0.79, and 0.94, and the general model's reliability is 0.942 (equivalent to 94.2%) which indicates the appropriate reliability of the test, its dimensions, and subscales.

In the confirmatory factor analysis method, it is first necessary to study the validity of indices to determine that the selected indices have the necessary accuracy in measuring the subscales and dimensions of the model. In such a way that the factor load of each index with its component and dimension has a t-value higher than 1.96 at the significant level of 0.05 and 2.58 at the significant level of 0.01 and positive. In this case, this index has the necessary accuracy to measure that hidden structure or attribute.

All indices have an appropriate factor load on their latent variable, and these factor loads are significant with respect to the t-value at the 0.01 level. In other words, the t-value corresponding to each factor load is greater than its critical value (2.58) at the level of 0.01. As a result, it can be said that these indices have the necessary accuracy to measure the indices of each component, so they entered the final analysis.

Each of the personality traits, individual skills, managerial abilities, managerial skills, specialized knowledge, and specialized experience can act as a component for the dimensions of the competency model of the country's health network managers, so the second-order confirmatory factor analysis is performed (**Figure 1** and **table III**).

Table I: Results of qualitative research analysis.

Dimensions	Components	Number of items	Indices
Basic competencies	Personality characteristic	19	Commitment to work, honesty, good manners, determination in action, altruism, high work conscience, discipline, self-confidence, flexibility, confidentiality, responsibility, spirituality, confidence-building, insight and awareness, accuracy and speed, open to criticism, regularity.
	Individual skills	22	Verbal and writing skills, decision-making skills, performance evaluation skills, effective listening skills, communication skills, problem-solving skills, learning and personal development, ability to influence others, empowering others, analytical thinking, emotional intelligence, creative thinking, creativity and innovation, personal development, motivation skills, negotiation skills, coaching, critical thinking, learning skills, effective presentation, systematic thinking, self-awareness.
Managerial competencies	Managerial abilities	11	Planning, organizing, coordinating, monitoring, and controlling, human resource management, financial resource management, physical resource management, information resource management, legal resource management, research and development management, marketing management.
	Management skills	16	Strategic thinking, leadership, team building and networking, entrepreneurship, the delegation of authority, time management, project management, performance management, transformation management, knowledge management, risk management, future management, contingency management, quantitative management, crisis management, management systemic.
Specialized competencies	Professional knowledge	15	Health system management, health policy, health system development, health economics, health information technology, health research, health education, medical education, specialized language in health, health law, health performance statistics and analysis, health system monitoring and evaluation, specialized education, principles and generalities of health services, primary health services.
	Specialized experience	7	Health care, work experience in the health center, work experience in the hospital, management experience in health centers, management experience in the health center, management experience in hospital, management experience in the health system.

Table II: Results of the reliability scale of the competency model of the managers of the country's health care.

Dimension	Component	Number of indices	Reliability	Desired level	Result
Basic competencies	Personal characteristics	19	0.879	Greater than 0.70%	Confirmation
	Personal skills	22	0.920	Greater than 0.70%	Confirmation
Basic competencies		41	0.940	Greater than 0.70%	Confirmation
Managerial competencies	Managerial abilities	11	0.796	Greater than 0.70%	Confirmation
	Managerial skills	16	0.903	Greater than 0.70%	Confirmation
Managerial competencies		27	0.916	Greater than 0.70%	Confirmation
Specialized competencies	Specialized aknowledge	15	0.822	Greater than 0.70%	Confirmation
	Specialized experience	7	0.899	Greater than 0.70%	Confirmation
Specialized competencies		22	0.855	Greater than 0.70%	Confirmation
General model		90	0.942	Greater than 0.70%	Confirmation

Figure 1: Model for measuring the competence of managers of the country's health care network in the standard mode.
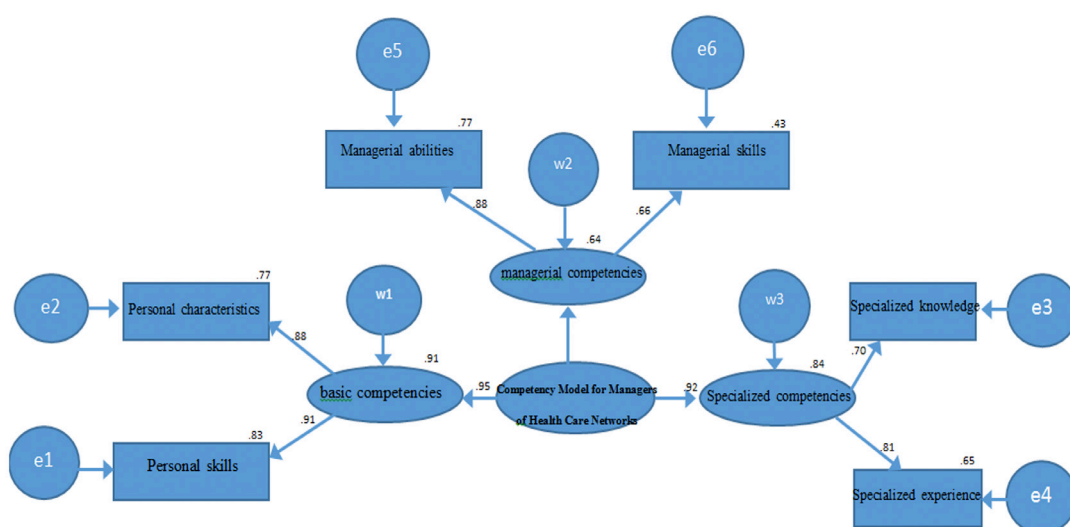
Table III: Results of the second-order confirmatory factor analysis of the competency model of the country's health care network managers.

Component	Factor load	t-value	Significance level	R^2
Personal characteristics	0.88	65.10	0.01	0.77
Personal skills	0.91	78.03	0.01	0.83
Managerial abilities	0.88	88.97	0.01	0.77
Managerial skills	0.66	116.98	0.01	0.43
Specialized knowledge	0.70	29.03	0.01	0.49
Specialized experience	0.81	38.63	0.01	0.65

Table IV: Results of the third-order confirmatory factor analysis of the competency model of the managers of the country's health care network.

Model dimensions	Factor load	t-value	Significance level	R^2
Basic competencies	0.95	35.11	0.01	0.91
Managerial competencies	0.80	37.42	0.01	0.64
Specialized competencies	0.92	34.97	0.01	0.84

Table V: Results of confirmatory factor analysis of the competency model of the country's health care network managers.

Measurement model	x^2	df	x^2/df	RMSEA	GFI	CFI	NFI
Competency model							
Desired level accepted by fit indices			Less than 4	Less than 0.08	About 0.90 and greater		
Result			Confirmed	Confirmed	Confirmed		

Table VI: Results of Friedman ranking to test dimensions and subscales of the competency model of the country's health care network managers.

Variable	Value of test statistic	Number	Degrees of freedom	Test error (sig.)	Test level
Subscales	64.143	179	5	<0.01	0.01
Dimensions	33.209	179	2	<0.01	0.01

As shown in **table III**, the values of factor load are desirable in the second-order factor analysis. On the other hand, the t-value corresponding to each factor load is more than its critical value (2.58) at the level of 0.01 and is significant. Furthermore, the coefficient of determination (R2) measures the relationship between the explained variance of a latent variable and its total value of variance. The value of this coefficient is between zero and 1, the larger the values, the more desirable. Values of 0.19, 0.33, and 0.67 are described as weak, moderate, and significant, respectively. According to **table III**, the values of R^2 are significant and desirable.

Since each of the components of personality traits, individual skills, managerial abilities, managerial skills, specialized knowledge, and specialized experience related to the dimensions of basic competencies, managerial competencies, and specialized competencies act from the competency model of health network managers of the country, so the third-order confirmatory factor analysis is performed (**Figure 1** and **table IV**).

Table IV shows that the factor load values are desirable in the third-order factor analysis. On the other hand, the t-value corresponding to each factor load is more than its critical value (2.58) at the level of 0.01 and is significant. Furthermore, according to **table III**, the values of R^2 are significant and desirable.

Table V shows the results of confirmatory factor analysis of the competency model of the managers of the country's health care network.

The results of confirmatory factor analysis (measurement model) of competency model of the managers of the country's health network in **table V** show that the ratio of chi-square to the degree of freedom (x^2/df) in measuring the competency model of the managers of health network and its indices are less than the desired level and the acceptable value is 4 and also the value of the root index of estimating the variance of the approximation error (**RMSEA**) in the measurement model is less than the significant and acceptable level of 0.08, which indicates a suitable and good fit. Similarly, the values of goodness of fit index (**GFI**), comparative fit index (**CFI**) and normed fit index of Bentler-Bonnet (**NFI**) are about 0.90 and greater than the desired value of 0.90, which are considered appropriate and desirable values. Therefore, the measurement model of the competency model of the country's health care network managers and its dimensions are supported by the research data at the appropriate level of the theories used and is a suitable model to explain the competency of the country's health care network managers. Therefore, all indices and dimensions used in the research have the explanatory power for the competency model of health care network managers in the country and according to the validity results, fitness characteristics, reported reliability coefficients and factor, data collection tool has technical features (reliability and credibility) at a very good level.

Table VI shows the results of Friedman ranking test to examine the dimensions and subscales of the competency model of the managers of country's health care network.

Table VII: Distribution of the average dimensions and components of the competency model of the managers of the country's health care network.

Components	Number	Average	Standard deviation
Personal characteristics	179	4.06	0. 98
Personal skills	179	3.84	1.07
dimension: basic competencies	179	3.95	0. 81
Managerial abilities	179	3.51	0. 97
Managerial skills	179	3.79	0. 83
dimension: managerial competencies	179	3.97	0. 82
Specialized knowledge	179	4.00	0. 92
Specialized experience	179	3.94	0. 91
dimension: Specialized competencies	179	3.65	0. 67

Table VII: Results of ranking the dimensions and components of the competency model of the managers of the country's health care network.

Scale	Component		Dimensions	
	Average rank	Prioritization	Average rank	Prioritization
Personal characteristics	3.97	1		
Personal skills	3.60	4		
dimension of basic competencies			2.29	1
Managerial abilities	2.74	6		
Managerial skills	3.28	5		
dimension: managerial competencies			1.68	3
Specialized knowledge	3.73	2		
Specialized experience	3.67	3		
dimension: Specialized competencies			2.13	2

Table VI shows that the error value of the Chi-square test obtained is less than the significance level of 0.01 which results in an error level of less than 0.05. Therefore, the significance of Friedman test means that the ranking of dimensions and subscales of the competency model of the country's health network managers is significant, and the research sample has a different ranking of the dimensions and subscales of the competency model of the country's health network managers.

Table VII shows the distribution of average dimensions and components of the competency model of the managers of the country's health care network.

Table VII shows that among the dimensions and components of the competency model of the managers of country's health care network, the next dimension is "managerial competencies" with a value of 3.97 and the component of "personality traits" with a value of 4.06, respectively.

Table VIII shows the ranking results of the dimensions and components of the competency model of the managers of country's health care network.

Comparing the average rankings of the dimensions and components of the competency model of country's health care network managers in **table VIII** shows that the highest average rank (2.29) among the dimensions of model is attributed to the dimension of basic competencies in scoring, that is, the most important dimension of the competency model of the managers of country's health care network is the dimension of basic competencies. Similarly, the highest average rank (3.97) among the components of the model is attributed to

personality traits in scoring, that is, the most important component of the competency model of health care network managers is personality traits.

Discussion

Based on this study's results, the competency model of Iranian health care network managers with three dimensions of basic competencies, managerial competencies, and specialized competencies, six indices of personality traits, individual skills, managerial abilities, managerial skills, specialized knowledge, and specialized experience and 90 indices were designed and presented. Among the dimensions of the model, basic competencies and among the indices, personality traits were the most important. According to the results of study by Fanley et al.[7], the main competencies of managers of health care organizations are as follows: quality evaluation based on outcomes, strengthening professional competencies, planning based on process management, project cost evaluation, informal communication style, and participatory leadership. The results of this study are consistent with the study of Alrich et al.[8], and Zahedi et al.[9].

Regarding basic competencies, flexibility, negotiation skills, systematic thinking and analytical thinking were identified as the most important and emphasized points. In the study of Andreja et al.[10], in connection using competency models in leadership assessment in nursing, the index of flexibility in work was emphasized as one of the most important issues. In the study of Messium et al., communication skills, flexibility, lifelong learning, teamwork, and participation were identified as some of

the most important skills needed by new managers in the field of health[11]. What is important is that the basic competencies that were mentioned in various studies should play a key role in the selection and appointment of managers, and it is necessary to continuously monitor and improve these competencies after employing people in managerial positions.

In terms of managerial competencies, planning and coordination, strategic management, systematic management, and contingency management were of the highest importance. According to the research results, the level of attention to various elements in strategic planning was moderate and high. In the study of Sadeghifar et al. among the community of hospital managers, the indices of creating a vision for the future / studying and predicting the future, evaluating strengths and weaknesses, as well as examining current threats and opportunities as components of strategic management, attracted the most attention[12]. In studies conducted by Aung et al.[13], Karmnad et al.[14], Trayulasa and Rekltesib[15], and Kansal and Jane[16], indices of ability to plan, coordinate, communicate, have strategic thinking were emphasized as managerial competencies. Therefore, this study's results are consistent with the mentioned studies.

In the field of specialized competencies, having specialized education and knowledge in the fields of health system management, health policy, health economics, and monitoring and evaluation of the health system was of the highest importance. Moreover, having work experience and effective experience in the field of health services administration was emphasized by the participants in the study. The ACHE model[17] also places great emphasis on the characteristic of professionalism as one of the main items of competence of health managers. In the study of Ranjbar et al.[18], specialized knowledge and information and professional credibility, and in the research of Abolghasemi et al.[19], technical and managerial knowledge were considered important and priority characteristics of specialized competencies of managers which is consistent with the findings of this study.

Conclusion

At present, in Iran, the election and appointment of health network managers is mainly based on a static model and mainly based on fixed and evidence-based conditions. The transition from this approach to a competency-based approach is something which can be the source of positive and sometimes transformational changes in the health care delivery system. The competency model designed in this study can be used to select the managers of health and treatment networks in the country by considering localization, educational needs assessment, redefining the performance appraisal system, optimizing the career path management system, etc.

Study limitations

In this study, a survey (questionnaire tool) was used to validate the model; there were limitations associated using this tool in this research. The limited studies and previous records on the competencies of health managers in the country have limited the possibility of comparing the results of this study with previous studies.

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Author's Contribution

Study concept and design: Pourmenati, Masoudi Asl, Hesam, and Vahdat. Statistical analysis and interpretation of data: Pourmenati, Masoudi Asl, and Hesam. Drafting of the manuscript: Pourmenati, Masoudi Asl. Critical revision of the manuscript: Hesam, and Vahdat.

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