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(Original Article)

Human Resource Productivity Indicators Factor Analysis: Emphasizing Scientific and Ethical Factors

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Abstract

Background: This study was an attempted to identify human resource productivity indices by emphasizing scientific and ethical factors in service organizations.
Method: the research method was mixed method (qualitative - quantitative). In terms of the qualitative research, the indicators were extracted via analyzing studies conducted both inside the country and outside the country, and semi-structured interviews were conducted with 20 university professors and experts using purposeful sampling method. The categories and propositions were identified by 26 indices and categorized into two dimensions of ethics-commitment and technical-technological under the general scientific-ethical factor set. In terms of quantitative research, a researcher-made questionnaire with Cronbach's alpha of 0.988 was administered to 250 managers and staff experts of Ardebil Education Department with the aim of validating the qualitative results.
Results: Based on confirmatory factor analysis results of both dimensions, the correlation coefficients indices between all variables and the present variables (dimensions) are significant since their T-values is significance at the alpha level of 0.05 and the fit indices of NFI, CFI, IFI in both dimensions are greater than 0.9.
Conclusion: The results revealed that the measurement model of research variables on dimensions of ethical-commitment and technical and technological is appropriate. Also, the results of the present research can be applied in measuring and evaluating human resources productivity of service organizations in order to improve productivity and development of the organization.

Keywords: Productivity indicators, Commitment, Ethics, Technical skill

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Introduction

One of the most important resources in any organization is its human resources. Proper utilization of human resources in order to achieve higher productivity is one of the most important tasks of human resource management in organizations (1). One of the main advantages of the organizations in third millennium is the issue of human resource. Human resources have the chief role in producing most of the capital in developed countries and the percentage role of other factors such as natural resources are very low. In Japan, for example, 80% of capital is generated by human resources and less than 20% is generated by natural resources and other factors. While, in developing countries, 64% of generated capital is related to natural and other resources and 36% of capital is produced by human resources. To increase productivity as well as enhancing the nature of business life, human resource management provides access to positive improvements by utilizing various indicators related to the workforce both in terms of productivity and the nature of business life (2). Today, the inadequate use of intellectual resources, intellectual ability and potential capabilities of human resources is one of the most important challenges that the managers face in organizations (3).

In modern times, the role of human resources during crises is crucial to prevent irreparable damage and the roles of human resource managers are greater (4). The efficiency of human resources management is definitely associated with investing in capital of human and minimizing strategic costs (4). Productivity and promotion is one of the major goals of any active and vibrant organization (5). The reason behind paying attention to employee productivity is that productivity is one of the factors that guarantee the consistency and survival of organizations in today's highly competitive world (6). So, identifying effective and relevant factors to productivity is of significance since attaining information about the relations of the factors associated with productivity and modifying and manipulating them would improve the productivity and steps would be taken to develop the organization (5). In modern management systems, human resources are the most important asset of the organization, and appreciating the values and needs of the employees is the most effective step in achieving the goals of the organization (7). Productivity is defined as gaining the maximum probable profit by applying workforce, power, talent and skill (8). Productivity is not just applicable in the industry but it is applicable in all sectors of the economy, including industry, services and agriculture. Today, with the development of information and computer technology, the average rate of productivity in the service sector has grown rapidly. Increasing productivity in service organizations is one of the characteristics of today's advanced societies (9). Productivity indicators are often used to measure the progress and success of organizations and determine their strengths and weaknesses (9). It is very difficult to calculate these indicators, especially in-service organizations that produce intangible services (9). The lack of productivity indicators in one organization obscures the status of that organization, causes the scale vacuum in adjusting the current performance with previous performances of other organizations and fails to recognize and identify the strengths and weaknesses of the organization for healthy competition between human resources and planning organization development (10). Limiting available resources, increasing population, and increasing human needs and demands have made economic, policy and management communities and organizations more productive (9). In general, every manager needs to evaluate performance of employee in both formal and informal ways. Given the inevitability of this task, the effectiveness and efficiency of the performance is dependent on gathering accurate and reliable information by managers.

Selected indicators for measuring productivity should be easy to calculate. Productivity indices should have features such as accuracy, objectivity, tangibility, comprehensibility, homogeneity, renewability, controllability, being determined qualitatively, and being analyzed. Today, the importance of productivity and the need to investigate it with respect to expanding levels of competitiveness, complexity, technology, and resource shortages are

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not covered. Despite the importance and breadth of productivity, the concept of productivity is not clear to many managers (11).

Productivity, according to the statement of the World Conference on Productivity Sciences, includes employment, effectiveness and efficiency (12) and is a criterion that evaluates the extent to which activities are effective and efficient in achieving a specific goal (13). Today, one of the main concerns of organizations managers is the efficiency of employees and organizations since the low level of efficiency in many manufacturing and service organizations is one of the problems of developing countries. It could be said that in order to improve productivity and achieve organizational goals effectively, the efficiency should be increased (14). At the same time, staff performance efficiency, to some extent, depends on their knowledge, skills, abilities as well as their mental conditions (15). Efficiency is a topic that was presented scientifically fifty years ago by a senior management expert called Peter Drecker. Various researchers have been conducting studies on this issue since 1970. Effectiveness is defined as the extent to which an organization achieves its goals. It can be said that the focus is on influencing the results of the work, and in fact, the effectiveness is achieved when the organization managers determine the appropriate and desired goals and choose the [roper affairs to conduct (16).

For some researchers, factors affecting human resource productivity include seven basic dimensions: ability, understanding and cognition, organizational support, motivation, feedback, credibility, and adaptability (17). The Japan Product Center considers staff training and empowerment, participatory management, and fair distribution as the factors affecting human resource productivity. Productivity indicators are often used to measure the progress and success of organizations and identify their strengths and weaknesses. (9).

Increasing salaries and benefits is not adequate for increasing workforce productivity. At the same time, it is very important to pay attention to the emotional issues and spiritual needs of human beings. Human resource management by optimizing the potential of existing human resources and capabilities of the organization, designing an appropriate payment system based on performance, competence and individual skills, human resource retention, training, and human resource development can enhance the productivity of the organization.

They consider ability, clarity, assistance, evaluation (training and performance feedback), motivation, validity and validity of personnel, environment (environmental fit) as the factors that affect human resource productivity (18).

Based on Wiksi and Kepner, workforce productivity is influenced by the nature of work and personality of individuals (fitness between job and the owner of job), motivation (material and spiritual), job awareness and recognition, job satisfaction, quality of working life, individual participation in profit or activity, and equitable behavior with people. Speed of operation, quality of operation, unit cost, flexibility of work, commitment of people, proper communication, understanding of the necessity of productivity, satisfaction and quality of working life, and good participation are factors influencing workforce productivity from the point of view of Steiner (19).

Autonomy in applying professional elaboration and purpose, knowledge and acceptance of organizational goals by the elite and motivation to achieve them, up-to-date technical skills and knowledge, initiation in achieving goals and objectives, teamwork and productive collaboration, technology, the existence of other supports for professionals, and the optimal use of time are seven key factors affecting staff productivity (20).

The success of the organization depends more on the skill and expertise of the staff and their continuing professional training. Therefore, the level of training, skills, expertise and experience of the human commission staff is very important in their decisions. The success or failure of human resource departments affects the whole organization.

According to researches, four dimensions are considered for productivity: creativity, job satisfaction, commitment, and cooperation for. Factors affecting productivity are divided into two categories: (A) individual or personal factors including experience, income, education level, age, and education, and (B)

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environmental factors including participation, social relationships, job content, and job satisfaction (21). Various theoretical and empirical researches indicate the involvement of employees in the decision-making process as a major factor in increasing productivity and have shown a positive and direct relationship between these two factors (22). In order to attract and retain its employees, every organization needs to use an appropriate pattern for employee benefits. According to Hersi and Blanchard, money is a very complex incentive or stimulator that besides physiological needs is involved in all sorts of needs and determining its importance is a difficult task. According to Helden, the three major motivational theories that provide the theoretical foundations for service compensation strategies are: Maslow's hierarchy of needs theory, Herzberg's health motivation theory, and Porter and Lavler's motivational model.

It is conducted a research in which he mentions to factors influencing improvement of education teachers' productivity. These factors are: job motivation, learning ability, information literacy, ability and competence, adequate education, teamwork, system decency, salary, payment and wages, empowerment of subordinates, providing welfare services, appropriate environment and culture, subordinate participation, performance evaluation system, establishing organizational justice, appropriate management style, facilities availability, existence of organizational commitment, facilitating communication, delegation, and clarity of the job nature (2).

Researchers classified the factors affecting human resource productivity as the dimensions of organizational indifference, human resource development, empowerment, structural and occupational issues, management dereliction, organizational health, and Islamic context (19). A researcher identifies the productivity indicator in 4 dimensions of efficiency, effectiveness, commitment and cooperation, problem solving (24). The indicators of efficiency dimension are: speed of execution of tasks, optimal use of available equipment, optimal use of consumables tasks. The indicators of effectiveness dimension are accomplishing tasks correctly without mistakes, customer satisfaction (individuals or units receiving the job or beneficiary) of employee performance, delivering good quality jobs. The indicators of commitment dimension are having self-control (very little need for supervisor to control tasks), planning and managing tasks and their duties, arriving at work at predetermined times, having a commitment to work and organization (no indication of a willingness to resign or relocate), adherence to plans and promises, and cooperating. The indicators problem solving are finding new and innovative ways to improve performance quality, resolving work problems, making effective use of the courses of the organization, transferring experience and knowledge to colleagues, helping to solve business problems, and tend to improve and enrich the job.

They carried out a research in which he identified and prioritized eight factors affecting human resource productivity which are motivation, organizational commitment, power, organizational support, job recognition, validity, performance feedback, and environmental adaptation in order of importance. Motivation has the greatest impact on the performance of staff in sports organizations (25).

In a study the relationship between self-discipline and its levels with productive staff productivity and the correlation between self-discipline and productivity was significant and its levels of self-discipline had a high predictive effect on human resource productivity (26). Organizations can be considered as one of the important factors in explaining productivity changes.

The level of organizational commitment of employees is related to productivity and its dimensions, and there is a significant relationship between productivity and demographic variables of sex, age, experience and education (27).

Staff commitment, staff attention, talent use, paying attention to change, desired behavior and proper behavior of leaders and managers, providing career progress for all staff, in-service training courses and staff training, clarity of all tasks, providing guidelines, rules, and regulations for employees, giving employees adequate authority, participating in decision making, and formulating goals and plans are different ways of enhancing the productivity of the workforce (28).

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A researcher considers continuous job training of managers and employees, promotion of motivation among employees for better and more work, creation of appropriate contexts for initiative and creativity of managers and employees, establishment of proper performance-based payment system, establishing a system of discipline and encouragement, work conscience and social discipline, changes in systems and methods, strengthening the power and dominance of organization policies over affairs as the factors affecting augmenting productivity of human resources (9).

The components of the Crest model are commitment and communication, respect, enthusiasm, Safety, and mid-career training. In the Hersy and Goldsmith model, these factors include performance, ability and ability to successfully perform a task, clarity, Impetus evaluation, credibility, and environment affecting the performance and productivity of human resources in an organization and in Kate Davies and John New Storm's 1986 model on factors affecting human resource productivity is mentioned to factors such as leadership quality, worker trust and Employer, two-way organizational communication, fairness of rewards, clarity of work, and employee participation. In Goodwin's model, factors are considered at the three individual, occupational and organizational levels, and taking steps to improve productivity starts from an artistic state at an individual level and continues until the implementation of practical plans (29).

In the crest model, factors such as commitment and productivity, respect and esteem, enthusiasm, security and support are involved to improve the productivity of human resources and the umbrella term of crest covers these factors (29).

The compilation of human resources productivity indicators helps to formulate an overall productivity management strategy in the organization, improving the effective communication and collaboration between different units and parts of the organization, causing compatibility between management, workforce and human capital empowerment programs, Consistent evaluation and uniform procedures in determining the extent of human resources productivity, applying organizational performance evaluation mechanisms, running the evaluation indicators and measurement. Therefore, the present study seeks to identify human resource productivity indicators in service organizations using content analysis and factor analysis. So, this question is raised that what are the indicators of human resource productivity with emphasis on ethical dimensions and technical skills in service organizations?

Material and Methods

In this study, a sequential exploration method was used. First, the library method was used to collect productivity indicators from documents, dissertations, researches, articles, and textbooks and giving them to 20 university professors and experts. After the interviews in the focus and theoretical saturation groups, sampling was stopped with 26 indices. In the second step, to validate the qualitative stage of data collection, a researcher-made questionnaire was designed. At first the questionnaire was administered to 35 statistical samples in order to confirm the validity and reliability of the questionnaire. The results showed the Cronbach's alpha of 0.988 and consequently the validity and reliability of the questionnaire was confirmed. The total number of statistical samples was 250 (All managers and staff of Ardebil Province Education General Staff). To analyze qualitative data through content analysis, a descriptive and inferential statistical method such as central and dispersion indices such as mean, standard deviation, and factor analysis were used to determine the relationships between indicators and their coefficients of importance and ranking. All analyzes were performed using LISREL and SPSS software.

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Figure 1: Research steps

Results

Qualitative findings in response to research questions of (1) what are HRM indicators with emphasis on ethical dimensions and technical skills in service organizations? And (2) what are the dimensions of human resource productivity measurement which are in line with the identified indicators? In this study, through content analysis approach that explore factors, dimensions and indicators of HRM measurement in service organizations (Table 1), 26 indicators from theoretical articles and foundations were extracted and classified into a general scientific-ethical factor including dimensions of ethics-commitment and technical-technology.

Table 1: Scientific-ethical factor classification of human resource productivity indicators in service organizations

Factor	Aspects	Related indicators	
		Indicator number	Percentage
	Ethics and Commitment	15	57.5%
Scientific- ethical	Technical and Technology	11	32.5%
		26	100%

Table 2: Bartlett and KMO test results to determine the adequacy of the sample of questionnaire indicators

Bartlett and KMO tests	Adequacy of KMO sampling measurement	0.896
	Approximate chi square	24813/782
	Degrees of freedom	4950
	The significance level	0.000

According to the table, the approximate chi-square or Bartlett's Spherical Test is equal to 24813/782 which is significant at alpha level less than 0.0001. Therefore, it shows that the data correlation matrix is not zero in the community and the factorization function is justified, so the assumption that the correlation matrix is a single matrix is rejected.

Table 3: Kolmogorov-Smirnov test results for research variables

Aspects	Number	Mean	Standard deviation	Significance level	Test statistics	Results
Commitment and Ethics	15	4/2133	0.54177	0.145	1.742	Normal
Technology and Technical	11	3/9756	0.60107	0.001	1.525	Normal

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Table 4: Analysis of factors contributing to the amount of variance explained in measuring human resources productivity

Row	Indicators to measure human resource productivity in service organizations	Estimate variance
1	The commitment of the individual to work and organization (no signs of changing the workplace or resignation)	0.789
2	Fair treatment, respect for the rights and legitimate demands of others	0.788
3	Popularize trust, , honesty and benevolence	0.742
4	Commitment and communication, respectful behavior and affectionate cooperation with colleagues and clients, good partnerships with individuals	0.767
5	Economize on government properties, countering wastage	0.751
6	Edification	0.787
7	Respect and value for human beings, good company, and commitment to ethics	0.728
8	Commitment to programs and promises	0.728
9	Self-control, (very little need for supervisor to control affairs)	0.758
10	Having a plan and the ability to manage your own tasks at work at predetermined times	0.787
11	Performing out-of-office job duties where necessary	0.657
12	Work conscience and social discipline	0.697
13	Encouraging others to abide by social order, rules and regulations and social behavior	0.721
14	Carrying on affairs on time, professional commitments, being punctual, and effective use of working time	0.752
15	Compliance with laws and administrative hierarchy	0.766
16	Mastering the laws and regulations of the field of work and the methods of doing business in the organization	0.678
17	Use of new technologies and applications	0.751
18	Ability to properly use equipment	0.740
19	Ability to apply experiences, skills and job training	0.794
20	Trying to equip the facilities required for new technologies and encouraging the subset to cover the use of these technologies	0.765
21	Design and use of information systems management and utilization of information and communication technology to fulfill this role	0.767
22	Virtual training and electronic development in the organization	0.769
23	Fighting premature or aging in the organization	0.796
24	Creating a database/documentation and archiving experiences to create a learning organization culture	0.732
25	Electronicization of collaborative business processes such as electronic surveys	0.703
26	Entering staff information into electronic system and preparation of staff database and performing teleworking activities	0.768

Table 5: Confirmatory factor analysis results for the commitment and ethics dimension

Result	Statistic T	The degree of correlation with the present variable	Question	The commitment and ethics dimension	Result	Statistic T	The degree of correlation with the present variable	Question	The commitment and ethics dimension
Confirmed	9.43	0.56	Q 9		Confirmed	10.57	0.63	Q 1	
Confirmed	10.67	0.62	Q 10		Confirmed	13.06	0.73	Q 2	
Confirmed	5.40	0.34	Q 11		Confirmed	12.56	0.71	Q 3	
Confirmed	12.27	0.70	Q 12		Confirmed	13.28	0.74	Q 4	
Confirmed	8.74	0.58	Q 13		Confirmed	11.46	0.66	Q 5	
Confirmed	14.28	0.78	Q 14		Confirmed	13.55	0.75	Q 6	
Confirmed	8.51	0.52	Q 15		Confirmed	14.26	0.78	Q 7	
					Confirmed	13.75	0.76	Q 8	
			NFI = 0.91	& GFI = 0.92	& CFI = 0.92	& IFI = 0.92			

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It can be seen that (Table. 5) all questions related to variables have significant correlation coefficient with present variables (dimensions) because T values that are greater than 1.96 or smaller than -1.96 are representative of significance of relations at alpha level of 0.05. On the other hand, all factor loadings of all fifteen questions except question 11 are greater than 0.5 and factor loadings of 11 questions out of 15 questions are more than 0.6 which are highly favorable. The results show that in the dimension of commitment and ethics, the highest correlation is related to the 7th component of the question (respect for human beings, good association and good behavior and adherence to ethical principles in relation to colleagues) and 14th component (Carrying on affairs on time, professional commitments, being punctual and effective use of working time). That is, questions 7 and 14 determine and predict more of the variance of the relevant variables. Also, the values of the table show that Chi-square = 593.72 and the fit indices of NFI, GFI, CFI, IFI are greater than 0.9 and the measurement model is a good model in terms of ethics and commitment dimension and fit indicators are appropriate to this variable.

Table6: Confirmatory factor analysis results for the technological and technical dimensions

Result	T statistic	Correlation with current variable (factor load)	Question	Technological and technical dimension	Result	T statistic	Correlation with current variable (factor load)	Question	Technological and technical dimension
Confirmed	11.51	0.67	Q 22		Confirmed	11.43	0.66	Q 16	
Confirmed	8.93	0.54	Q 23		Confirmed	12.65	0.72	Q 17	
Confirmed	11.47	0.67	Q 24		Confirmed	11.28	0.66	Q 18	
Confirmed	11.29	0.66	Q 25		Confirmed	11.46	0.67	Q 19	
Confirmed	9.46	0.57	Q 26		Confirmed	14.27	0.78	Q 20	
					Confirmed	14.70	0.80	Q 21	
		NFI = 0.91	& GFI = 0.82	& CFI = 0.92	& IFI = 0.92				

According to Table. 6, it can be seen that all questions related to variables have a significant correlation coefficient with the current variables (dimensions) because T values greater than 1.96 or less than 1.96 represent significant. Relationship level is 0.05. The factor loadings of 9 out of 11 questions are more than 0.6 which are very desirable. The results show that in the technological and technical dimension the highest correlation is related to question 21 of the component (Design and use of information management systems and utilization of information and communication technology). That is, Question 21 predicts a greater degree of variance in the relevant variables. Also, the values associated with the table show that Rmsea = 0.151 is the average model fit. Also, Chi-square = 294/52 and the fit indices of NFI, CFI, IFI are greater than 0.9, so this result shows that the measurement model of the research variables on the technological and technical dimension of the model is appropriate and the fit indices are appropriate for this variable.

Discussion

The results of this study indicate that whatever the instrumental climate variable is strengthened in banks the more, traumatic factors are the more reinforced. Therefore, it is consistent with the results of research that showed negative relationship between ethical climate and job stress and intention to quit the job (20). By increasing caring climate, independent climate, professionalism climate and rule climate, human traumatic factors decrease .Thus with research results that described the effect of ethical climate on trust of supervisor and organizational trust (21)and the results of research showed that components of benevolent

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leadership have a significant and Results on ethics and commitment dimensions, indicators of organizational support, individual commitment, social philanthropy, helping to solve others' problems, honest commitment, patience, fairness, respect, respect for rights and desires legal and legitimate others, reputation for trustworthiness, integrity, integrity, benevolence, commitment and communication, respectful and cooperative behavior with colleagues and clients, satisfaction and quality of working life, proper relationship with individuals, indicators of fairness in distribution, cost Avoid the use of al-Muttal, counteract extravagance, avoidance, and prevent harm and abuse, observing the use of economic opportunities in the workplace, Self-discipline, Studying divine piety, respecting human being, good fellowship with one's colleagues, observance of Islamic ethics and adherence to principles, commitment to programs and promises, self-control, performing activities with proper qualities, avoiding partiality in applying skills, planning commitment and ability to manage your tasks and duties, being at work at predetermined times, accomplishing out-of-office job tasks, work conscience and social discipline, persuading others to comply with administrative discipline, rules and regulations and social behavior, performing tasks of work on time and professional commitments, being punctual and effective use of work hours, compliance with administrative discipline, full compliance with administrative rules and hierarchies, considering other individuals' rights, position and responsibilities, and morale Individual commitment to work and commitment to work and organization are consistent with some previous researches (23-28)

The results of technical and technological aspects of staff with indicators, mastery of the rules and regulations of the field of work, detailed knowledge of the process of operations and methods of work in the organization, application of new technologies and software and application of appropriate techniques and technologies in performing tasks, ability to properly utilize equipment, ability to apply work experience, skills and training with job clarity, up-to-date technology, job redesign and job enrichment, and a desire to improve and enrich, cooperating and making effort in equipping required facilities for new technologies and using them in job activities. Encouraging the covered subsets to use new technologies, use of new technologies and application software in performing tasks, virtual training and developing electronic in the organization, Fighting premature or aging in the organization, creating a database, documenting and archiving experiences, fast information flow , technology and other support for professionals, electronic processes for collaborative electronic research such as electronic surveys, electronic services, electronic teleworking, and the effort to develop the software needed for the job are consistent with the studies (24-29).

Productivity indicators are used to measure the level of productivity in an organization. Today, the importance of productivity and the need to examine it are not covered. Productivity indicators are often used to measure the progress and success of organizations and identify their strengths and weaknesses.

Developing productivity dimensions and indicators and presenting a human resource productivity model in service organizations is a vacuum that providing a model for measuring the efficiency and productivity contribute to all sectional, multisectional, and intersectional managers to determine and measure the human resource productivity. The findings of this study can be used to identify productivity weaknesses or to compare the productivity of service organizations, especially education and training with previous years. It is suggested that managers, considering the existing philosophy of service organizations and organizational goals, support the establishment of a productivity measurement system and modify productivity indicators, and motivate organizational managers to use productivity indicators to evaluate organizational performance. Since focusing on the indicators provides the infrastructure needed to improve productivity in the organization, these indicators can be used as a guide and indicator for establishing a productive organization by being compared with other organizations. Due to the fact that participants who were interviewed were faculty members, chiefs and deputies,

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the problem of lack of time, difficulty of the interview process and the generalization of statistical population of the present study (Ardabil province staff) are the research limitations.

Ethical Consideration

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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