The Mediation Effect of Innovation on the Relationship Between Creativity and Organizational Productivity: An Empirical Study Within Public Sector Organizations in the UAE

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Abstract: This study employs structural equations modelling via. AMOS to analyse the 278 valid questionnaires in order to assess the proposed model to identify the factors that influence organizational productivity. Health Authority Abu Dhabi (HAAD) is the focus of this study where an innovative approach is applied to assess the impact of creativity through innovation on organizational productivity. The study describes the relations among the various constructs. Our work has improved our insight about organizational productivity. Results indicated that the creativity significantly predicted innovation which in turn influenced the dependent variable. Further it was found that creativity has an indirect effect on organizational productivity through innovation. The proposed model explained 41% of the variance in organizational productivity.

Key words: Creativity, innovation, organizational productivity, UAE, organizational, dependent variable

INTRODUCTION

The latest developments in the theory of economic growth highlight the significance of innovation for continuous output and growth of productivity (Wadho and Chaudhry, 2018). Innovation has become the central pillar of success for any organization in world's current business. There are many factors that contribute to the rapid scale of innovation such as, product's short life cycle with an increased rate of product development in addition to fast-evolving technology, all of which stimulate changes to the nature of economic development. Innovation is now a core part of organizational strategies to achieve and sustain a competitive advantage in the market. It will be more complex due to rapid changes in customer wants and technology (Calcantone *et al.*, 2002; Khalifa and Abou-Shouk, 2014; Abd-Elaziz *et al.*, 2015; Abou-Shouk and Khalifa, 2017; Khalifa and Ali, 2017; Khalifa and Fawzy, 2017; Khalifa and Mewad, 2017).

In terms of macroeconomic literature it is generally known that innovation is a key driver of economic growth (Grossman and Helpman, 1991). This notion is extensively documented as well by Fagerberg *et al.* (2010), two aspects have been identified as critical aspects in the economic growth models which are: the adoption of technologies developed elsewhere and indigenous innovative capabilities.

It is important to re-emphasize that innovation and productivity are related to different concepts. The concepts have been used interchangeably and are still not clear to many researchers especially from the human resource perspective and without clear justification (Kirigia *et al.*, 2007; McAfee and Champagne, 1993; Raju, 2015). It was observed as part of the study to conceptualize performance and productivity as different but related concepts. Additionally, the assessment of innovation as a mediating variable between creativity and organizational productivity. The mediating role of innovation may enhance the overall effect of an organization's ability to channel employee creativity towards organizational productivity (Al-Dhaafri *et al.*, 2016).

The context of this study is Health Authority Abu Dhabi (HAAD) where the challenge of working with different nationalities remains a major issue to multinational organizations and the UAE at large. Investigating the impact of creativity and innovation on the productivity of public organization would be of tremendous benefit to fulfill the strategy and goals of the UAE government, multi-national businesses and other global enterprises at large. The objective of this study is to examine the impact of creativity as independent variable and innovation as a mediating variable on organizational productivity in Health Authority Abu Dhabi (HAAD).

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Literature review

Organizational Productivity (OP): Antony and Bhattacharyya (2010a, b) defined organizational productivity as "the rate at which goods and services are produced by a standard population of workers". Others such as Bernolak (1997) defined productivity as the quantity of goods produced and in the most efficient and effective manner from a limited amount of resources. The European Association of National Productivity Centres (EANPC) also defined productivity as the effectiveness and efficiency of processes used to produce goods and services (Pekuri *et al.*, 2011). Keywords noteworthy in the definition of productivity include the "efficient" and "effective" process of transforming "inputs" into "outputs". Thus, clearly implies productivity is a process and an output as established in the case of performance.

The efficiency of the process implies the ability to employ inputs or resources in the right way where a minimal amount of resources is employed to achieve an optimum outcome or performance (Grunberg, 2007). By Neely *et al.* (1995), the effectiveness of the process of productivity refers to the ability of the production process to achieve desired goals. In specific terms, Pekuri *et al.* (2011) term efficiency as doing things right and effectiveness as "doing the right thing". The terms effectiveness and efficiency define productivity and have remained inseparable. Effectiveness refers to the ability to reach a unique objective whereas efficiency depicts the achievement of this objective in an economical and resourceful manner. Further, according to Burke and Black (1990) in order to improve organizational productivity, certain steps need to be taken by the organization. They mention that it is important to make efforts to enhance the effectiveness of managers in hopes of improving product or service quality (Khalifa and Fawzy 2017). It is also critical to reducing cases of waste, absenteeism and rejects or work resistance in operational processes of the organization (Badran and Khalifa, 2016). Others including Pekuri *et al.* (2011) build on the notion that the concept of productivity has not exactly been easy to define and remains highly ambiguous.

Creativity (CR): Amabile (1983) explains that creativity is the process that is undertaken when developing an idea for a new product. DiLiello and Houghton (2008) also contribute and go on to add a distinction between creativity and creativeness they argue that creativity entails the ability to be original, expressive and imaginative whiles creativeness, on the other hand, refers to the potential or ability to be creative. By Amabile *et al.* (1996), measurement of creative performance is done externally through the observation of products or achievements and their evaluation. In general, there five main factors as suggested by Andriopoulos (2001) that are found to influence innovation. These five main factors include organizational climate, leadership style, organizational culture, resources and skills and structure and systems of organizations. Consequently, the following hypothesis are proposed:

- H_1: creativity has a positive effect on innovation

Innovation (INN): Innovation depends on creativity; this is evident in Amabile *et al.* (1996) definition of innovation generally as the implementation or adoption of new ideas by an organization's members. Rolstadas (1998) argues strongly that innovation is a required element if any organization aims to improve its performance. Often when the innovativeness of any given organization is considered it refers to that organization's innovative performance in each time (usually a year) with significant consideration to its level of output be it goods or services (Christensen, 2006). Therefore, for an organization that aims to not only survive but also compete strongly it is important that an innovation-friendly business strategy, organizational structure, top management style as well as middle management practices and effective methods of managing innovation are is adapted to achieve innovation and competitive success (Khandwalla and Mehta, 2004). Consequently, the following hypothesis are proposed:

- H_2: innovation has a positive effect on organizational productivity
- H_3: innovation mediates the relationship between creativity and organizational productivity

MATERIALS AND METHODS

Overview of the proposed research model: The relationships between constructs hypothesized in the conceptual framework have been adapted from the relevant literature in the subject matter. Figure 1 shows
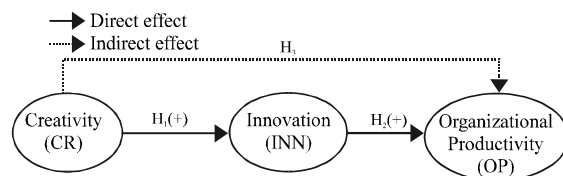

Fig. 1: The proposed model

Table 1: Instrument for varibles

Varible/Measures	Sources
Creativity (CR)	
CR1: I make it a point to always have new ideas in my area of work	
CR2: My creativity at work is measured periodically (monthly, annually etc/)	
by my department or administration	Antony and Bhattacharyya (2010a, b)
Innovation (INN)	
INN1: Workers in my department build on new ideas all the time	
INN2: Workers in my institution are required to be innovative by adopting new tools and ideas	Antony and Bhattacharyya (2010a, b)
Organizational Productivity (OP)	
OP1: Optimal Quality is achieved in the department service deliveries (successful procedures)	(Rao and Miller, 2004)
OP2: All quantity benchmarks are met by the department (example; target number of patients to be treated per day)	
OP3: Resource is used in the most efficient way by the department	
OP4: Timelines are met at all times in the department	
OP5: The institution has mastered itself in the performance of its duties	

Table 2: Respondent's profile

Variables	Frequency	Valid (%)
Gender		
Male	121	47.451
Female	134	52.549
Age		
18-24	19	7.451
25-34	83	32.549
35-44	112	43.922
45-54	40	15.686
55 and above	1	0.392
Education		
Senior High School	30	11.765
University or 1st degree	126	49.412
Postgraduate or PhD	88	34.510
Other	11	4.314
Position		
Nurse	35	13.672
Midwife	35	13.672
Physician	39	15.234
Dentist	43	16.797
Pharmacist	39	15.234
Alternative medicine	22	8.594
AHP	43	16.797
Class		
SEHA (public)	133	52.157
Non-SEHA (private)	122	47.843
Total	256	

the proposed model that contains creativity and innovation to predict organizational productivity. These relationships are taken from Antony and Bhattacharyya (2010a, b). The proposed model examines the relationship between the aforementioned constructs among employees in health authority Abu Dhabi in the United Arab Emirates. The proposed conceptual framework has three hypotheses to test.

Development of instrument: The development of instrument for this study included a 9-item questionnaire and based on the organizational productivity literature a multi-item Likert scale was applied (Lee *et al.*, 2009). Constructs were measured using a Likert scale which recommended in the previous studies (Isaac *et al.*, 2016, 2017a-e) with 7 being "Strongly agree"and 1 being "Strongly disagree". Given the fact that the respondents were Arabic-speakers it is required to have the

questionnaires translated from English to Arabic in a precise way (Aldholay *et al.*, 2018a, b). Thus, a back translation was applied which is a procedure widely used in a cross-cultural survey (Brislin, 1970). Previous studies were used to get a validated to measure the variables in this study as shown in Table 1. The number of items for each construct is estimated based on guidelines of Hayduk and Littvay (2012) who recommended the use of the few best items.

Data collection: The data was collected by delivering a self-administered questionnaires "in-person" from July 2017 till November 2017 to employees within Health Authority Abu Dhabi (HAAD). The number of the distributed questionnaires was 750 and the number of the returned sets is 400 of which 290 responses were considered suitable for the analysis. According to Tabachnick and Fidell (2012), Krejcie and Morgan (1970) the sample size was seen as sufficient. Compared to the relevant literature the 69% response rate of this study is considered very good (Baruch and Holtom, 2008). The number of the deleted questionnaires was 22 including a 15 missing data cases of more than 15% of the questions and 7 cases that have a straight lining (Table 2).

RESULTS AND DISCUSSION

Data analysis and results: For this study, the main reasons for choosing SEM as a analytical technique is that SEM offers a simultaneous analysis which leads to more accurate estimates (Isaac *et al.*, 2016, 2017a-e).

Descriptive analysis: In Table 2-4, the values of mean and standard deviation are illustrated as follows: creativity mean score of 4.551 out of 7.0 with a standard deviation of 1.295, indicating that the respondents agreed that they make it a point to always have new ideas in their area of work and their creativity at work is measured periodically by their department or administration.

Table 3: Measurement model stats

Fit index	Cited	Admissibility	Result	Fit (Yes/No)
χ^2			54.148	
DF			24	
p-value		>.05	0.000	No
X²/DF	Kline (2010)	1.00-5.00	**2.256**	**Yes**
RMSEA	Steiger (1990)	<.08	**0.007**	**Yes**
SRMR	Hu and Bentler (1999)	<.08	0.037	Yes
GFI	Joreskog and Sorbom (1998)	>.90	0.956	Yes
AGFI	Joreskog and Sorbom (1998)	>.80	0.917	Yes
NFI	Bentler and Bonnet (1980)	>.80	0.963	Yes
PNFI	Bentler and Bonnet (1980)	>.05	0.642	Yes
IFI	Bollen (1990)	>.90	0.979	Yes
TLI	Tucker and Lewis (1973)	>.90	0.968	Yes
CFI	Byrne (2010)	>.90	**0.979**	**Yes**
PGFI	James *et al.* (1982)	>.50	0.510	Yes

χ^2 = Chi-square, DF = Degree of Freedom, GFI = Goodness-of-Fit, NFI = Normed Fit Index, IFI = The Increment Fit Index, TLI = Tucker-Lewis coefficient Index, CFI = Comparative-Fit-Index, RMSEA = Root Mean Square Error of Approximation, SRMR: Standardized Root Mean Square Residual, PNFI = Parsimony Normed Fit Index, AGFI = Adjusted Goodness of Fitm Index; The indexes in bold are recommended, since, they are frequently reported in literature (Awang, 2012)

Table 4: Mean, standard deviation, loading, Cronbach's alpha, CR and AVE

Constructs/Item	Loading (>0.5)	M	SD	α (>0.7)	CR (>0.7)	AVE (>0.5)
Creativity (CR)						
CR1	0.84	4.551	1.293	0849	0.849	0.737
CR2	0.88					
Innovation (INN)						
INN1	0.80	4.445	1.187	0.806	0.807	0.677
INN2	0.84					
Organizational Productivity (OP)						
OP1	0.84					
OP2	0.82					
OP3	0.80	4.663	1.086	0.918	0.918	0.691
OP4	0.85					
OP5	0.84					

CR = Composite Reliability; M = Mean; α = Cronbach's alpha; AVE = Average Variance Extracted; SD = Standard Deviation; The measurement used is 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree); All the factor loadings of the individual items are statistically significant (p<0.01); CR: Creativity, INN: Innovation, OP: Organizational Productivity

Innovation mean score of 4.445 out of 7.0 with a standard deviation of 1.187, indicating that the respondents agreed that workers in their department build on new ideas all the time and workers in their institution are required to be innovative by adopting new tools and ideas. Organizational productivity recorded mean score of 4.663 out of 7.0 with a standard deviation of 1.086, indicating that the respondents agreed that optimal quality is achieved in the department service deliveries, all quantity benchmarks are met by the department, the resource is used in the most efficient way by the department, timeliness is met at all times in the department and the institution has mastered itself in the performance if its duties.

Measurement model assessment and Confirmatory Factor Analysis (CFA): As shown in Table 3, all the goodness-of-fit indices surpassed their particular acceptance levels as recommended by previous research, hence indicating that the measurement model showed a fairly good fit with the data collected. The total fit indices show that the chi-square is not significant (p-value

should be >0.5). While the Chi-square is not significant, the model still fits because Chi-square statistic nearly always rejects the model when large samples are used (Bentler and Bonnet, 1980; Joreskog and Sorbom, 1993). The Chi-square sensitive to sample size >200 (Byrne, 2010) and the sample size for this study is 401. Therefore, we could proceed to evaluate the psychometric properties of the measurement model in terms of construct and indicator reliability and convergent and discriminant validity (Fig. 2).

As with regard to the construct reliability, the results show that all the individual Cronbach's alpha coefficients are bigger than the suggested level of 0.7 (Kannana and Tan, 2005). Furthermore in order to assess the construct reliability it was found that all values of the Composite Reliability (CR) were greater than the advised value of 0.7 (Kline, 2010; Gefen *et al.*, 2000) and by this result the construct reliability has been achieved (Table 4). To determine indicator reliability, factor loadings were observed (Hair *et al.*, 2013). The loadings for all the items surpassed the suggested value of 0.5, thus, the loadings for all the items are fulfilled all the
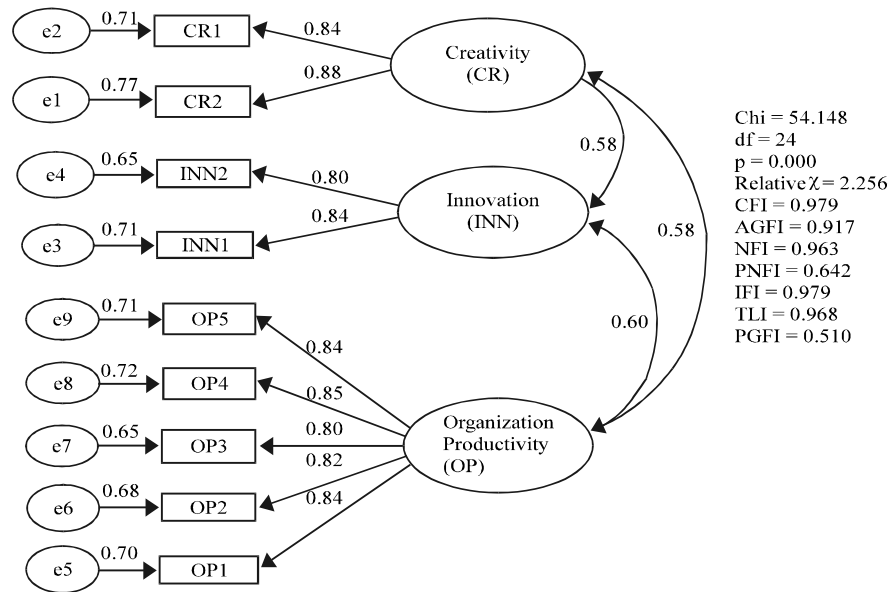
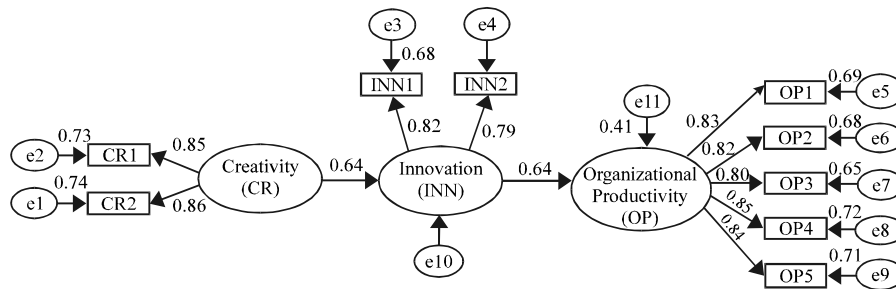Fig. 2: Result of Confirmatory Factor Analysis (CFA)

Fig. 3: Research structural model results

Table 5: Results of discriminant validity by Fornell-Larcker criterion

Factors	1 (CR)	2 (INN)	3 (OP)
CR	**0.859**		
INN	0.582	**0.823**	
OP	0.575	0.597	**0.831**

Diagonals represent the square root of the average variance extracted while the other entries represent the correlations; CR = Creativity; INN = Innovation; OP = Organizational Productivity

requirements without being eliminated from the scale. Moreover, to examine convergent validity Average Variance Extracted (AVE) was used, all AVE values were greater than the suggested value of 0.50 (Hair *et al.*, 2010). Therefore successfully fulfilled and it demonstrated sufficient convergent validity (Table 4).

Discriminant validity by results illustrated in Table 5, shows that the constructs are strongly related to their particular indicators (Fornell and Larcker, 1981; Chin, 1998a, b), hence indicating a good discriminant validity (Hair *et al.*, 2016). Further, the correlation among

exogenous constructs equals <0.85 (Awang, 2012). Therefore, the discriminant validity of all constructs is achieved.

Structural model assessment: The goodness-of-fit of the structural model was comparable to the previous CFA measurement model. In this structural model, the values were recorded as $\chi^2/df = 3.642$, CFI = 0.922 and RMSEA = 0.071. These fit indices provide evidence of adequate fit between the hypothesized model and the observed data (Byrne, 2010). Thus, path coefficients of the structural model could now be examined.

Direct hypothesis tests: The hypotheses were tested using the structural equation modeling via. AMOS (Fig. 3). The structural model assessment indications are illustrated in Table 6 with 2 out of the 2 hypothesis of this study being supported. Creativity significantly predicts innovation. Hence, H_1 is accepted with ($\beta = 0.64$, p<0.001).

Table 6: Structural path analysis result

Hypothesis	Dependent variables		Independent variables	Estimate (B) (path coefficient)	SE	C.R (t-values)	p-values	Decision
H_1	INN	<---	CR	0.64	0.067	8.283	0.000	Supported
H_2	OP	<---	INN	0.64	0.075	8.707	0.000	Supported

SE = Standard Error; CR = Critical Ratio ; CR = Creativity; INN = Innovation; OP = Organizational Productivity

Table 7: Coefficient of determination result (R^2)

exogenous construct	Endogenous construct	R^2	Cohen (1988b)	Chin (1998)	Hair *et al.* (2013)
CR	INN	0.4	Substantial	Moderate	Weak
INN	OP	0.41	Substantial	Moderate	Weak

CR = Creativity; INN = Innovation; OP = Organizational Productivity

Table 8: Bootstrapping the indirect effect of innovation

Hypothesis	Relationship	Std. Beta	SE	t-value	p-value	Decision
H_3	CR→INN→OP	0.41	0.090	4.55	0.000	Supported

Preacher and Hayes (2004, 2008); CR = creativity; INN = Innovation

Likewise, innovation significantly predicts organizational productivity. Hence, H_2 is supported (β = 0.64, p<0.001). Note that the standardized path coefficient indicates the strengths of the relationship between independent and dependent variables, so, the direct effects of creativity on innovation are equal to the direct effects of innovation on organizational productivity.

Coefficient of determination R^2; The variance explained: The R^2 resulted from structural model showed that all R^2 values are sufficiently high, so that, the model can fulfill a satisfactory level of explanatory power (Urbach and Ahlemann, 2010) (Table 7).

Indirect hypothesis testing (Mediation assessment): The mediation effect test is based on Preacher and Hayes (2004, 2008) which is using the method of bootstrapping of the indirect effect. Table 8 illustrates the result which shows that the indirect effect β = 0.41 was significant with a t-value of 4.55. Additionally, Preacher and Hayes (2008) indicate that the 0.41, 95% Boot CI: (LL = 0.197, UL = 0.552) does not straddle a 0 in between indicating there is mediation. Therefore, it was concluded that the mediation effect of the innovation variable is statistically significant, also supporting H_3.

Based on the proposed model, this study improves the understanding of the role played by creativity along with innovative in predicting organizational productivity at Health Authority Abu Dhabi (HAAD) in the United Arab Emirates and highlights relevant implications. The discussions are further detailed in the following.

The study found that creativity significantly predicts innovation among employees within the Health Authority Abu Dhabi in the United Arab Emirates, this is supported by previous studies (Rao, 2016; Ringrose, 2013). It is explained by the fact that the more the employees are always bringing new ideas to their area of work and have their creativity periodically measured by the management,

the more the employees are to build on new ideas all the time and fulfilling the organization requirement to be innovative by adopting new tools and ideas.

Likewise, it was also found that innovation significantly affects organizational productivity among employees within the Health Authority Abu Dhabi in the United Arab Emirates, this is supported by previous studies (Antony and Bhattacharyya, 2010a, b; Terouhid and Ries, 2016). It is explained by the fact that the more the employees are to build on new ideas all the time and fulfilling the organization requirement to be innovative by adopting new tools and ideas, the more optimal quality is achieved, benchmarks and timelines are met, resources are efficiently utilized and the organization reached a mastery level in the performance of its duties.

Finally, the results also revealed that creativity has an indirect effect on organizational productivity via innovation among employees within the Health Authority Abu Dhabi which confirms the mediation role that innovation has in this context. Simply stated, the more the employees are always bringing new ideas at their area of work and have their creativity periodically measured by the management, the more optimal quality is achieved, benchmarks and timelines are met, resources are efficiently utilized and the organization reached a mastery level in the performance of its duties, given that employees are building on new ideas all the time and fulfilling the organization requirement to be innovative by adopting new tools and ideas.

Implications, limitations and future directions: The research prescribed here has implications for the improved understanding of the links between the various significant dimensions related to organizational productivity in UAE's public sector. The results should be of interest not only for HAAD but also to the Abu Dhabi local government authorities as well as researchers. The present research is of significant for practitioners as it illustrates the importance of creativity and innovation.

Although, a link of causality between the variables of this study cannot be clearly recognized because of the cross-sectional design, the results indicate that creativity and innovation are important to facilitate and enhance the organizations' productivity.

This study emphasizes the importance of creativity and links it with innovation and performance but it does not address the issue of how creativity could be nurtured. More research may determine the antecedents of creativity in the same context and develop a comprehensive framework of both antecedents and consequences. It is expected that key findings especially the proposed model will help in supporting the UAE government policy initiatives, especially to increase productivity as part of the job at all levels of organizations.

We live in a world that is driven by technology and innovation where change is continuous and overwhelming. There is a persuasive call for a constant research effort in the area of productivity. This study has a limitation of being conducted in only one organization of the public sector in the UAE, thus, the result should be taken with caution.

CONCLUSION

In order for any organization to experience productivity growth it is essential to make changes in its structures or mode of operation. While the United Arab Emirates government institutions are leading in terms of performance compared to regional counterparts it is in a constant pursuit to enhance its public organization's productivity (Anonymous, 2016), the findings of this study could be considered as one of the initiatives to serve on that direction. The main objective of this study is to determine factors that influence organizational productivity at Health Authority Abu Dhabi (HAAD). Despite various constraints to the study, the results have been encouraging, as it has managed to throw some lights on a new perspective. The proposed model includes creativity as independent variable and innovation as mediating variable in addition to organizational productivity as the dependent variable. The results revealed that the creativity and innovation significantly explain 41% of organizational productivity. The implications of this study have been deliberated, some directions for future research have been suggested.

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