

## **Innovative Approaches to Management of Virtual Teams Leading to Reliability and Retention**

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### **ABSTRACT**

**Purpose:** The paper focuses on identification of variables affecting management leading to reliability and retention of virtual teams.

**Methodology/Approach:** The data were collected globally from 323 managers working with virtual teams; members were hired and worked fully virtually with team members from different countries and time zones. Respondents were from all continents. The data were evaluated by tested by reliability tests and two and multidimensional statistics (Spearman's correlation, principal component and factor analysis).

**Findings:** Empowerment and encouraging were proven as variables significantly affecting management of virtual teams' reliability. Variables leading to employee retention are communication, performance appraisal, career plans, training and leadership/supervision to overcome barriers. Efficient management in virtual environment is significantly related to policies and career possibilities. Over 20% of managers are incompetent to work with virtual teams. The main threat leading to failure of virtual teams is burn out based on social distancing.

**Research Limitation/Implication:** Limitation of the study is the first approach to the virtual teams' management only focusing on ICT employees. The findings revealed significant relations leading to virtual operations impacting employees' performance, reliability and retention.

**Originality/Value of paper:** This paper provides an insight into the importance of innovative approach to virtual teams, as virtual employees may strive with low social contact and less support from organization.

**Category:** Research paper

**Keywords:** virtual teams; human resource management; retention; remote; reliability

## 1 INTRODUCTION

Virtual teams are becoming an integral part of modern organizations. After the Covid-19 era, management in virtual environment have been considered a necessity by organizations. Past years, even pre-Covid, global organizations invested significant amounts of money and sources to support smooth operation of virtual teams and virtual managers. The global outreach of Covid and use of communication technology for continued operations has further facilitated the idea of remote workstations where employees are working in the geographically differentiated regions but stay online and work together on organizational goals.

A number of studies show that managing virtual teams is more difficult than managing collocated teams, as leaders have less influence and less information about the status of the team; process management and team dynamics can be impaired; it is difficult to set up practices to uncover and resolve conflicts, motivate team members and monitor members' performance; it is difficult to build trust and team cohesion – see Davis and Bryant (2003), Zaccaro and Bader (2003), Zigurs (2003), Dulebohn and Hoch (2017). These problems are closely related to the reliability of virtual teams and the retention of employees in the organization and management need to focus on specifics of virtual teams (Gilson et al., 2015).

The aim of this paper is to test variables affecting management of virtual teams and significantly impact virtual teams' success. The research formulates and tests hypotheses revealing variables affecting virtual teams' reliability and retention.

The study tests model of management in virtual environment. The model is build and analysed based on factor analysis. This paper contains a review of the existing literature, presents methods followed by results, that are further discussed and conclusions are presented.

### 1.1 Theoretical Background

Virtual teams represent a work arrangement where team members are geographically dispersed, have limited face-to-face contact, work interdependently, and use electronic communication media to achieve common goals (Dulebohn and Hoch, 2017). Within virtual teams, knowledge workers collaborate despite time and distance to combine efforts and achieve a set goal (Bell and Kozlowski, 2002). The use of virtual teams holds great promise for the future (Dulebohn and Hoch, 2017). Mobility and flexibility are examples of megatrends that influence everyday life and also intensively change the way we work (Großer and Baumöl, 2017). The use of virtual teams thus represents a new chance in this context. For employees, this is associated with flexibility (regarding location and working hours), for organizations in an increasingly digital environment, it means competitiveness (new technological opportunities, employee retention, cost efficiency). From the point of view of competitiveness

on the labour market, it is about offering a work environment that provides time flexibility. The deployment of virtual teamwork is not only supported by technological and societal changes, but also seems relevant for employee retention (Großer and Baumöl, 2017).

Employee retention was described by James and Mathew (2012) and Bidisha and Mukulesh (2013) as a process in which employees are encouraged to remain with the organization for the maximum period of time (or until the project is completed). Mita, Aarti and Ravneeta (2014) defined employee retention as “a technique adopted by businesses to maintain an effective workforce and at the same time meet operational requirements”. In the context of virtual teams, these are techniques within an organization that enable effective work teams to be maintained while meeting operational requirements. Based on impact of Covid-19, employers take steps to ensure that employees stay with the organization as long as possible (Alferaih, Sarwar and Eid, 2018; De Smet et al., 2021). According to Anitha (2016), virtual employee retention is not easy as the workforce is becoming more confident and demanding due to changes in markets and demographics. The employee retention process (in the context of virtual teams) represents a strategic tool for the success of the organization (Aburub, 2020). Kossivi, Xu and Kalgora (2016), described factors determining employee retention: management/leadership, conducive work environment, social support, development opportunities, autonomy, compensation, work-life balance and employee training and development. Attention has been paid to manager’s leadership style, the organization’s commitment to social responsibility, autonomy, work-life balance and technology (Khan and Wajidi, 2019; Valentine and Godkin, 2017; Kim and Stoner, 2008; Koubova and Buchko, 2013; Haar and White, 2013). According to Lee et al. (2022), there are still no studies that examine the effect of all these factors on employee retention and the underlying mechanism of these relationships. There are also no studies focused on this issue in the context of virtual teams. That is why this study was conducted. Based on the above mentioned, the following hypotheses on variables impacting management of retention of virtual teams were stated:

H1 (retention): Virtual team retention is related to positive perceptions of current employer.

H2 (retention): Virtual team retention is related to motivation and willingness to stay at current position.

Sishuwa and Phiri (2020) identified the main factors influencing employee retention, but also developed a framework based on a causal model and recommended possible solutions. Authors found that job satisfaction, organizational commitment and workplace structures are important for employee retention; however, individual characteristics did not have a significant influence on employee retention. Howard-Grenville (2020) emphasizes the need to focus on research into organizational dynamics among remote workers in order to explore the role of cultural factors in shaping remote workers’ interactions.

Pianese, Errichiello and da Cunha (2022) discuss five “control domains” – control systems, supervisory management styles, trusting relationships, organizational identification, and work identity. They conclude that the management of remote workers represents a shift from direct supervision to management by objectives, and is linked to a leadership style that emphasizes trust-relationships and the empowerment and self-control of remote workers. Further, the organizational and managerial approach emphasizes the autonomy of remote workers, and empowerment often co-exists with a strict control (Porter and van den Hooff, 2020). Pianese, Errichiello and da Cunha (2022) stated that behavioural control promotes overcoming tensions and misunderstandings in cross-cultural teams, the study has shown the importance of combining technocratic control with socio-ideological control, based on informal sharing of norms, beliefs and values among team members, trusting relationships and team identification, which strengthens alignment of individual and collective goals. The ability of leaders to support and empower of virtual team members during virtual meetings and through electronically mediated communication is essential for this soft form of control. According to Arunprasad et al. (2022), stressed the need to develop conceptual frameworks related to the influence of culture on the remote work implementation and collaboration. O’Neill et al. (2016) adds that effective communication helps to build reliability and commitment, and interaction plays a crucial role, which was confirmed by Watson-Manheim, Chudoba and Crowston (2012) and Olson and Olson (2013). Based on these studies, the role of reliability in management of virtual teams will be tested by the following hypotheses:

H3 (reliability): Virtual team reliability is related relevant periodic performance appraisal.

H4 (reliability): Virtual team reliability is related to clearly communicated policies.

This paper focus on identification of variables affecting efficiency of management of virtual teams. Current research has shown that virtual teams present a number of challenges compared to collocated teams (Newman and Ford, 2021). Appropriate approaches to human resource management (Bulińska-Stangrecka and Bagieńska, 2019), knowledge sharing and collaborative culture (Kim, Billingham and Lee, 2018) contribute to building a sustainable competitive advantage through innovation management. These aspects also need to be addressed in the context of remote work management and appropriate systems and procedures need to be designed and implemented (Arunprasad et al., 2022).

In the context of the above findings and relations, this paper defines and tests the main variables affecting quality management and impacts virtual teams’ retention.

## 2 METHODOLOGY

This study is based on questionnaires investigation of global managers working with virtual teams. The data were collected globally from 323 managers. Companies were selected based on their global operations and focus on ICT. The teams were considered virtual when members were hired and worked fully virtually with other team members from different countries worldwide and through different time zones. The sample was defined using Cochran's formula. The survey was used due to the fact that it was difficult to reach out to managers in dispersed locations worldwide (Saunders, Lewis and Thornhill, 2015). The questionnaire was designed to monitor actions of managers of virtual teams to lead employees online including focus on their welfare, the quality of interactions, impact of online work on satisfaction, reliability and factors impacting retention in virtual environment. Respondents were asked to provide their insight into their remote management and employee experience, distractions, reliability, performance appraisal and retention. Respondents had to indicate their views on recommending other people to work in their companies, organizational culture, remuneration, satisfaction on current position or possibility of external mobility.

The questionnaire had six identification questions, and ten main sections with 5-10 closed-ended Likert-scale sub-questions per each section. The scale was designed having five points from strong agreement to strong disagreement (see Tab. 1). The whole questionnaire and each sub-section were tested for validity using the Cronbach's Alpha (CA) test. As the whole questionnaire and each sub-section reliability reached value over 0.9, it was considered reliable and used for statistical analyses (Sullivan, 2011). The Pearson correlation ( $r$ ) method was used to test relationships between the variables.

*Table 1 – Questionnaire on Management of Virtual Teams Design and Validity*

Category	Sub-Category	No. of questions per category	Reliability	Validity
Management in virtual environment	Quality of virtual interactions	11	CA 0.996	<0.05
	Responses to changes in remote work	9	CA 0.960	<0.05
Impact on Reliability	Policy of home office	4	CA 0.979	<0.05
	Distractions at home office	12	CA 0.997	<0.05
	Impact on performance	10	CA 0.984	<0.05
	Effects on psychic	6	CA 0.997	<0.05
Impact on Retention	Recommendation of the employer to friends and retention ability	7	CA 0.981	<0.05

## 2.1 Data and Sample

The data were collected online (CAWI) to employees who are working in virtual teams. The population and sample size was developed according to Cochran (2007) formula. Counting with ( $p = 0.5$ ) and taking 95% confidence level the required sample size is 384 respondents for unspecified total size of population. This formula was then adjusted to limited sample size. The test finally shown 254 responses. The final sample of presented survey is 323 responses. Therefore, it can be considered as representative.

All respondents were employees between ages of 18-65 years old, working in virtual team and they are managed virtually. The study respondents consisted of; 156 males (48.3%) and 167 females (51.7%). According to age groups, 43.0% of the respondents (139) were in age group 21-38, 43.3% (140 respondents) were aged 39-56 and 13.6% (44 respondents) were aged 57-65. Respondents came from all continents Africa, North America, South America, Asia, Europe, and Oceania; more specifically: EU, UAE, Mexico, South America, Australia, Oceania, India, Canada, Middle East, China, Russia, Kazakhstan and African countries. Respondents were asked to fill the questionnaire when they were working in different countries than they were located and teams contained members from different countries. Thus, the questionnaire goal was to reach out to maximum diversity of countries to simulate diverse virtual environment. The main business were 18% operations, 11% support services/administrations, 10% IT, 9% finance, 6% sales, manufacturing (5%), quality (5%), supply chain (4%), marketing (4%), legal (5%), R&D (3%), HR (2%) and 18% indicated they work in different business operations that does not match given categories (i.e. education, healthcare, entertainment, agriculture, hospitality and others). According to size of company, 19% were small organizations (1-49 employees), 35% medium-sized organizations (50-999 employees), 46% in large organizations (over 1,000 employees). The questionnaire was anonymous.

## 2.2 Data Analysis

All survey results were processed in SPSS and Excel. Firstly, the data table was checked for missing values and unfinished questionnaires were excluded from the data file. The questions and their constructs were tested for their internal consistency by Cochran's Alpha. All coefficients were reaching value over 0.9 showing adequate level and therefore the data were used for analyses. To evaluate the data, Spearman's coefficient was used, Pearson's test, and ANOVA. Based on satisfactory results of consistency tests and correlations, a multi-dimensional analysis was used. The multi-dimensional analysis was conducted using component analysis and factor analysis with Varimax rotation. The process of calculation and interpretation of results was processed according to Anderson, Fontinha and Robson (2019), Mishra et al. (2019) and Bell (2019).

To test relevance of data for factor analysis, the Kaiser-Meyer-Olkin test was used. The resultant value reached over 0.8. Thus, the data could be used for

multivariate analysis. Factors explain variability and dependence of considered variables. Theoretical factors were created (see Table 1) and further tested by factor analysis. The final output factors were reduced using the Maximum Likelihood Factor Analysis with Kaiser Varimax Rotation with a goodness of fit. For the selection of substantial factors, the Kaiser-Guttman rule was applied (i.e. substantial factors having a value within the range higher than 1) and subsequently the Sutin test was applied. The correlation coefficients are in the interval from  $<-1;1>$ . If the correlation coefficient is positive, it shows a direct proportion; negative shows indirect proportion. For the evaluation, the value of variable correlation higher than 0.3 (moderate correlation) according to Anderson, Fontinha and Robson (2019) was used. The data analysis was run by SPSS Statistics 22.

### 3 RESULTS

The results of presented study focus on variables that affect virtual teams' retention and reliability. The Tab. 2 shows first perceptions of managers on virtual management, where 1 mean not important and 6 stands for key emphasis of managers to attract virtual teams' members.

*Table 2 – Perception of Management Quality in Virtual Environment*

	N	Minimum	Maximum	Mean	Std. Deviation
Quality of interactions	323	1.000	6.000	4.432	1.035
Measures taken by organisation to adapt to virtual environment	323	1.000	6.000	4.105	1.127
Homework policy	323	1.000	6.000	4.071	1.253
Remote working experience	323	1.000	6.000	4.248	1.076
Distractions in home office	322	1.000	6.000	3.937	1.001

Notes: N – number of respondents.

According to the results, the most important according to managers working with virtual teams is quality of interaction. On the other hand, the threat of distractions is reported less in the studied sample.

The correlation analysis shown that emphasis has to be paid to quality of management of virtual teams that has to focus on the variables significantly affecting virtual teams' retention and reliability. Variables significantly impacting virtual teams' reliability are quality of interactions ( $r = 0.714$ ,  $p = 0.000$ ), homework policies ( $r = 0.634$ ,  $p = 0.000$ ), clear goals ( $r = 0.487$ ,  $p = 0.000$ ), fair treatment ( $r = 0.657$ ,  $p = 0.000$ ), access to trainings ( $r = 0.658$ ,  $p =$

0.000), clear career path ( $r = 0.502$ ,  $p = 0.000$ ), communication and feedback ( $r = 0.487$ ,  $p = 0.000$ ).

The presented data show that managers of virtual teams face new approaches of employees (i.e. 17% are unsuitable to fit virtual conditions – see Tab. 2), changed needs and requirements (online supervision, changes in motivation a communication that shift to individualized periodic goals, reskilling and upskilling and performance appraisal) that require new managerial skills. Attention has to be paid to employees' mental state and socialization during distance work (approx. 20% of employees are threatend by mental problems and burn-out syndrome – see Tab. 3), their motivation through possibilities for development and career progression (over 65% of employees are motivated by career opportunities), commitment and job satisfaction which proved to be the most influential areas of employee reliability and retention ( $r = 0.4$  to  $0.5$ ).

Factors affecting employee retention are according to the survey results mainly impossibility of career development (33%) and 24% rely on unsatisfactory remuneration, while 22% refers to unreliable manager relationship. Two third of respondents stated that the possibility of career development is crucial for them to stay at current job position. Impossibility to grow makes over 60% of respondents to search for another job elsewhere. Even when teams are meeting only virtually, there is a crucial need for clearly communicated development plans and meetings with manager in order to discuss current and future progress and perspectives.

Retention is significantly related to positive perception of current employer ( $r = 0.634$ ,  $p = 0.000$ ; H1 accepted) and motivation and willingness to stay at current position ( $r = 0.332$ ,  $p = 0.000$ ; H2 accepted). The analysis shown that management of virtual teams relies heavily on career management. The mean importance of this factor was the highest from all other searched areas (4.329). Main factor leading to employee mobility in virtual teams is lack of career opportunities.

To ensure reliability of virtual employees, managers need to focus on remote working experience, challenges while working from home, virtual evaluation and impact on the performance appraisal, and other impact of remote work on personality. All mentioned areas are playing significant role in reliability in virtual environment (all averages and means were reaching over 4 out of scale where 5 means the highest value (strong agreement). The correlations between reliability and relevant periodic performance appraisal are strong and significant ( $r = 0.634$ ;  $p < 0.001$ ) (H3 accepted). The tests also confirmed that clearly communicated policies for virtual teams are statistically significant predictor ( $F(4, 315) = 54.431$ ,  $p < 0.001$ ) of work experience and home office (H4 accepted). Respondents indicated that empowerment and encouraging is the most important strategy to enhance reliability of virtual teams.

The data were further processed by multivariate statistics. The model is significant as Kaiser-Meyer-Olkin (KMO) test value exceeds 0.9, Bartlett's test



p-value is 0.000. The correlation analysis provided adequate level of relations among tested variables and their significance. Sutin test was used to calculate final number of resultant factors. The four final factors are in Tab. 3. Totally, 54% of the variance was explained.

*Table 3 – Factors Describing Management of Virtual Teams*

Variable	Factor 1	Factor 2	Factor 3	Factor 4
Clear goals, and periodical performance appraisal	<b>0.671</b>	-0.043	0.128	-0.112
Opportunity to grow at current company	<b>0.622</b>	0.053	0.201	<b>-0.302</b>
Fair treatment regarding trainings, awards	<b>0.756</b>	-0.194	0.129	0.017
Recommend a job at current company	<b>0.693</b>	-0.226	0.111	0.046
No interest and pleasure in doing work	-0.151	<b>0.763</b>	-0.072	-0.010
Emotionally drained from work	-0.106	<b>0.782</b>	0.183	0.150
Difficulty concentrating on the work	0.100	<b>0.719</b>	0.196	-0.107
Burned out from my work	-0.110	<b>0.797</b>	0.097	0.148
Adequate career path and promotion plan	<b>0.683</b>	-0.050	0.210	<b>-0.352</b>
Online training programs organized to improve performance	<b>0.610</b>	0.095	0.110	-0.237
Supervisor helps in identifying and bridging the performance gaps	<b>0.633</b>	0.093	0.005	<b>-0.360</b>
Targets are communicated very clearly	<b>0.671</b>	0.055	-0.087	<b>-0.354</b>
More productive working from the office	0.279	0.125	<b>0.617</b>	0.166
Always get feedback, correct communication channels	<b>0.700</b>	0.040	-0.270	0.152
Comfortable working with teammates as virtual teams	<b>0.481</b>	0.205	<b>-0.563</b>	0.070
Overall morale in the company is good	<b>0.718</b>	-0.147	0.059	0.189
Able to reach full potential whilst working remotely	<b>0.433</b>	0.259	<b>-0.687</b>	-0.019
Company is able to attract high-quality employees	<b>0.693</b>	-0.078	0.050	0.072
Good access to HR for advice and assistance	<b>0.683</b>	0.011	0.019	0.214
% Of variance	31.601	10.841	6.202	4.679
Factor name	Efficient VT	Burn out VT	Unsuitable for VT	Incompetent VM

Factor 1 describes efficient management in virtual environment. It is formed by clear goals, performance appraisal, career development opportunities and support in career progression that includes training programs organized to improve performance, supervisor helps in identifying and bridging the performance gaps and clear communication. Factor 1 is related to adequate fit with team members, good morale within the team and in the company, possibility to reach HR department in case it's necessary. Efficient VT is defined mainly by clear communication, set goals and performance appraisal, career plans, progression and training or supervising to overcome barriers. One third of the sample was able to create and maintain this clear efficient virtual teams. Variables in factor 1 focus on internal strategic HR management of development and career progression.

Factor 2 describes 11% of sample threatened by burn out in the virtual environment and shows inappropriate management of virtual employees. It points out no interest in virtual work, emotional drain, and difficulties concentrating. This shows inappropriate recruitment for virtual teams. Factor 3 show that 6% of respondents are not a good fit for virtual team, are less productive online, not comfortable to cooperate virtually and not able to reach their full potential online.

Factor 4 defines incompetent management given virtual conditions. The main problems are no opportunity to grow, no career path and promotion plan, impossibility to address problems and no supervision nor help, lack of clear communication and lack of trainings and development. The factor analysis points out management failures within management of virtual teams: incompetent recruitment, lack of communication, lack of carrier possibilities. Virtual employees are usually highly qualified and skilled labour force with clear vision of their growing potential. Management should support VT to achieve high performance to get reliable and loyal employees.

## 4 DISCUSSION

This paper discusses innovative management practices related to retention and reliability of virtual teams. Four hypotheses were tested; two related to virtual teams' retention and two referring to virtual employees' reliability. All four hypotheses were accepted. Results show that virtual team management heavily relates on positive perceptions of current employer (H1), motivation (H2), clear carrier plans and relevant periodic performance appraisal (H3) and clearly communicated policies for virtual teams (H4 accepted). The results are in line with relevant researches. The detailed results are further discussed in the area of retention and reliability.

The influence of motivation and positive perception of employer on employee retention must be taken into account (Shah and Asad, 2018), which is in line with this study (H2 accepted). In case employees perceive lack of career perspectives,

it leads to low retention or low reliability. This study shows that skilled and proactive communicating managers are the key to success of virtual teams. In virtual environment, managers need to focus on how to lead and motivate geographically dispersed team members. Relation-oriented leadership behaviours have been identified as a key factor for effective virtual leadership (Bartsch et al., 2021), as tested and accepted by H1. This study found that managers need to pay attention to personalized periodical appraisal, fair treatment, periodic online trainings and development to improve performance, help to overcome performance gaps and promote an atmosphere of social support.

Employee reliability is impacted by the workplace environment, supervisor, and the opportunity for development (Malinen, Wright and Cammock, 2013; Shuck and Albornoz, 2007; Carnevale and Hatak, 2020), which is in accordance with the results of this study. Aburub (2020) emphasizes that employee engagement is related to company policy, culture, leadership style and strategic human resource management tools, (confirmed by H3). This paper results add factor of communication, in line with Powell, Piccoli and Ives (2004).

To avoid burnout in virtual teams, it is essential to establish an atmosphere of collaboration and provide team with the necessary autonomy (Liao, 2017). Support of employee motivation leads to reliability. Managers are required to adapt their leadership style to the requirements of virtual teamwork (Kauffeld et al., 2022) to training needs of their staff, which was tested and accepted by H4.

## 5 CONCLUSION

The findings in this paper tested and confirmed variables affecting reliability and retention of virtual teams. According to respondents, the most important in virtual teams' management is quality of interaction. The correlation analysis shown that quality of management of virtual teams is affected by the variables homework policies and overall organizational policies in relation to virtual work, clear goals, fair treatment, access to trainings, clear career path, communication, and feedback.

Significant portion of virtual employees strive with low social contact and less support, as over one fifth of managers of virtual teams lack competences to manage virtual employees in fully online environment.

The factors affecting virtual teams' reliability is impacted by positive perceptions and references of current employer (H1), motivation and willingness to stay at current position (H2). Virtual teams' retention is affected mainly by clear carrier plans and relevant periodic performance appraisal (H3), and clearly communicated policies for virtual work and home office (H4).

Quality management of virtual teams has to primarily focus on reliable employee–manager relationship. Periodic discussions on plans, updates, performance appraisal and career development are crucial for virtual team

retention. Impossibility to grow makes over 60% of respondents to search for another job. There is a crucial need for periodic team and individual meetings with manager in order to discuss current and future progress and perspectives. Respondents indicated that empowerment and encouraging is the most important strategy to enhance reliability of virtual teams. The key to virtual employees' retention and reliability are training and supervision. This innovative management approach also attracts potential workers. Presented factors were confirmed by correlation analysis, ANOVA, regression and factor analysis.

Incompetent management of virtual teams lead to inefficiency and mobility of virtual workers. Proven problems are lack of opportunities, missing or unclear career path and promotion plan, impossibility to address problems and lack of supervision or help, lack of clear communication and lack of trainings.

Limitation of this paper is narrow focus on employees working in IT. On the other hand, the tests proven reliability and representativeness. Future research may explore virtual teams in other business branches and investigate team relations and its impact on reliability and retention.

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Conceptualization, L.D.; Theoretical Background, J.H.; Methodology, Software, Validation, Formal analysis, Investigation, Resources and Data curation, L.D.; Original draft preparation L.D. and J.H.; Review and editing, L.D.

## CONFLICTS OF INTEREST

The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.



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