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Robo-Advisory: An Investor's Perception

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Abstract--- Purpose: *This research paper aims to examine the perception of individual investors towards the robo-advisory financial services and the performance of this innovative platform against human advisors.*

Design/ methodology/ approach: *A survey method was employed and a response set from 167 investors were collected to probe into the perception of potential investors on the robo-advisory. The relationship between the perception and the robo-advisory was established using the regression analysis and the hypothesis was validated using ANOVA.*

Findings: *The outcome of the study suggested that the investor's prefer the robo-advisory financial services platform over human advisors as far as investment was concerned.*

Practical Implications: *Clients and potential investors can avail an automated algorithm based investment platform. The robo-advisory platform can be enforced into the banking and insurance sectors for generating faster financial assistance and investment decision than a traditional human advisor.*

Originality/value: *The novelty of this paper lies in the empirical evidence of the impact of potential investors on the robo-advisory. The successful implementation of the robo-advisory in Indian firms will help the common man to avail a low cost and high accuracy advisory facility.*

Keywords--- *Robo-Advisory, Human Advisors, Exchange Traded Fund (ETF), Impact Analysis, Portfolio Management and Low Cost Investment.*

I. INTRODUCTION

In this world of technology, to be very clear, robo-advisory as an online software stands out of the queue for them who are "do it yourself" investors and young investors as well. It helps in building their portfolios, of investments, within a few minute and in a cost-effective manner.

Robo-advisors make jobs easier because they keep on providing investment guidelines to the potential investors about the benefits of a low-cost index fund investing.

Use of artificial intelligence has changed the working style of people in almost every sphere. Be it travel, health, education, communication or otherwise, now it has been entered into wealth management.

Many wealth management firms have taken on the artificial intelligence-based services to the clients so that they could be able to seek automated investment advice at any time as per their convenience. The services generated by this artificial intelligence-based platform are quickly accessible, cheaper, and transparent. Robots are now making

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complex things simpler and are providing financial advices and have been given an official name called “robo-advisors” (Singh & Kaur, 2017).

Users of financial services are accustomed to the traditional methods of solving problems or issues with the help and support of financial advisors. To provide them better clarity, the robo-advisory platforms are emerging on a large scale to guide initial investors in building their portfolios, in making the client on-boarding faster and smoother. It works on specific algorithms that have the ability to make the investment process faster and cost-effective.

The sound accuracy of algorithmic based acumen has been encouraging organizations to invest in the power of algorithms in order to hire employees, make investment decisions and to highlight the results (Dawes, Faust & Meehl, 1989). It is a latest introduction and innovations in Fin-tech which segregates investors quickly on the basis of their risk preferences and then starts framing their portfolios. Technological advancement has paved a path for the emergence of the robo-advisory for filling the gap in socially responsible investing (SRI) market place (Salampasis, 2017). In response to investors’ queries that whether they can be able to make some changes to their portfolios, robo-advisors answer to this by providing them features to make those changes possible.

Various instruments were used by financial services firms to get better clarity on robo-advisors. At present, the robo-advisors are using the Exchange Traded Fund (ETF) as an instrument for investing their client’s money, in an efficient manner (Ferri, 2015).

The robo-advisory platforms help advisory firms to adopt the strategies for attracting their clients. The field where robo-advisors are behind human advisors is; “Creativity and Innovation” (Levine & Mackey, 2017). But this is introduced, on a lighter note, in this paper**.** Robo-advisory, an algorithm based automated advisory platform, specifically assures many well-beings for both banks and customers as well, however, consumer acceptance has been moderate so far (Jung et al., 2017). According to Go Banking Rate report, at present millennial do not really want to work with human advisors. Only 16% work with human advisors according to the 2014 report of Wells Fargo (Journal of Financial Planning, 2015). In the US, 38 percent individuals aged from 18 to 34 year have embraced the robo-advisory platform for investment purpose; in contrast with the 4 percent individuals aged 55+ with investment instead of a pension plan (Fisch et al., 2017). The term “robo-advisors” is attractive and witnesses a good attention in the global financial firms, although, the term brings puzzle and blended emotions about what it actually means (Nikiforova, 2017).

A quick Google search on the term “robo advice” provides about 479,000 general results and about 43,900 news results. One of the most famous robo advisors is “Charles Schwab” which offers its clients with free service on first investment done by them on behalf of its client (Hougan, 2015). CEO of “Wealth front” says human advisors charge a fee of 1% of Asset under Management (AUM) (Journal of Financial Planning, 2015). The traditional human advisors may demand for a minimum of $5000000 or more assets, which may become very strenuous for a low and middle income client to afford (Fisch et al., 2017).

The objective of this research was to study the individual statements, opinions and perceptions towards the robo-advisory financial services. To make this research healthy and fruitful, a perception survey was planned and a

questionnaire was successfully forwarded, to the potential investors and individuals working in the IT sectors. Through this approach, the responses on robo-advisory services were collected or gathered from the target audiences. The potential investor's perception of the robo-advisors and their willingness to adopt this innovative platform in the near future was taken into account. To provide readers the clarity over this innovative investment platform, the overall benefits of robo-advisory financial services was brought into light, having the ability and potential to outperform the traditional human advisors in the domain of financial markets and services.

II. LITERATURE REVIEW

The modern world has successfully given birth to technology-based platform popularly known as "AI", which makes an individual work smartly than the traditional ones. An online financial advisory platform popularly known as the robo-advisory comes into light to guide small to large scale investors before and after an investment. Many people accepted and embraced it and for few traditional advisors and luddites this is a nightmare (Levine & Mackey, 2017). The objective of both human and robo-advisors coincide with each other, but the robo-advisor is more, a kind of, smarter than the human advisors.

In this era of AI, most of us would definitively embrace technology based financial advices in a cost-effective manner. Human advisors, if in the future intend to leverage on technology-based financial services/solution, would be able to provide or render effective financial advices and solutions to their clients and could help them drive their costs down (Tedesco, 2015).

Introduction of submissive and indexed investments, alongwith the programmed portfolio management has deteriorated many potential investor's perception towards the ascertained value of investment management (McCarthy, 2017). Robo-advisor, an online software, provides vital financial advice to their clients in a cost-effective manner with moderate to minimal human interposition. The robo-advisors provide an automated and algorithm-based financial advice so that their client's assets are automatically allocated, managed and optimized without fail (Sing & Kaur, 2017).

The concept of Evolutionary Algorithm (EA) has been strategically employed to improve and enhance the investment strategies of the potential investors in comparison to other ones (Kobets & Poltoratskiy, 2016). In robo-advisory platform an individual can create a robo account and therein be provided with investment decisions on behalf of its client by collecting enormous data. The decision-making technique was substantiated by a computer program called "Alpha Go" developed by Google (Park, 2016).

Robo-advisors play a great role in various fields like wealth-management, portfolio analysis, banking and insurance. This innovative investment platform gather more of a behavioral facts and statistics and apply algorithms that equalize protential investor's prefences with financial portfolios (Thiel & Raaij, 2017). There are hundreds of robo-advisory firms, but out of these the top most robo-advisors are Betterment, Personal c*a*pital, Schwab intelligent portfolios, Sig-fig, Wealth-front and Vanguard. The largest of these robo-advisory firm is the wealth-front which has successfully brought about $1.5 billion in asset, has attracted clients on a large scale and has bridled a surprising $100 million venture capital money (Hougan, 2015).

One of the popular robo-advisors named 'vanguard', has managed to create its own space in the robo world with the inclusion of CFP guidelines that can generate 30 basis points per year (Robinson, 2017). It has been forecasted that the robo-advisors could be able to accumulate a $2.2 trillion assets under management by 2020 (Salo, 2017). If you put a bull's-eye on wealth management firm, then you can observe that the robo-advisors are outperforming traditional financial advisors in terms of speed and accuracy. Wealth-front charges a service fee of 0.25% per year for managing the portfolio, re-balancing it regularly, engaging in tax-loss harvesting (Hougan, 2015). The US robo-advisory firms have generated a worth of $19 billion dollar in assets (Scott-Briggs, 2016). Betterment has acquired more than $1 billion in AUM and charges 0.15 to 0.35 percent for providing investment and management guidelines (Ferri, 2015).

The robo-advisory platform, Betterment has been embraced and used by some determined financial advisors to guide investors looking for tangible advice (Neal, 2017). Accepting technological progress can only keep advisers in the safety zone to create efficiency, maintain control and provide effective s to their clients (Bhatnagar, 2016). Lam (2016), suggested that the current companion of robo-advisors generally provide passive investment strategies keeping in mind the asset allocation and implementation, portfolio monitoring and portfolio rebalancing. Robo-advisors create value proposition for their clients by providing them cheap access to diversifying beta (Sharpe, 2005). The robo-advisory financial services, more often, believe in passive investing and therefore focus on Exchange Traded Fund (ETF), which successfully bring in client's money for investment and reduces their costs (Faloon & Scherer, 2017). Complexity of the financial markets, in addition to the comprehension of the financial advisory and evaluation of risks by the potential investors have paved a path for the robo-advisory platform (Fisch et al., 2017). The current paper has explained the concept of robo-advisory and its performance as compared to the human advisors which is in-line with the research of Fisch & Turner (2017). Client onboarding is the crucial stage that requires things to be done in a streamline manner.

Therefore, the robo-advisory puts few questions before their clients prior to analyzing their risk profile in an efficient manner (Tertilt & Scholz, 2017). Robo-advisors have continuously managed to render financial services to their clients in an efficient manner and have successfully stood out of the queue by managing diversified portfolios. The concept of "Digitalization" and its implication is very much familiar to everyone. The banking sector is the one where digitalization is emerging at a faster rate and thereby creating a strong edge and space for robo-advisory to perform the credit assessment of its customers in an efficient manner prior to the lending process. Just imagine, if financial risk assessment could be performed and facilitated through an automated algorithm based platform that to with accuracy and minimum human intervention, then it could definitely be a bonus point to the aforementioned sector. Hence, digitalization has paved a suitable path for the robo-advisory and helping it in challenging and outperforming the traditional human advisors (Jung et al., 2018).

Robo-advisors guide individuals in setting up the retirement plan as to how much one should invest to secure their post-retirement stage. They automatically diversify their client's portfolio and even also provide client's the access to make changes to their portfolios in case of any issues in the future. In the field of portfolio management Schwab Intelligent and Betterment prioritize investors, according to their investment goals and then optimize their assets on that parameter.

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Wealth-front tracks the basic needs of investors and frames their portfolios based on their investment power (Park et al., 2016). The prior research papers reflected the US advisory firms and took- into- account very few Asian advisory firms (Faloon, 2017; Scherer, 2017; Park, 2016; Ryu, 2016; Shin, 2016; Ferri, 2015). This paper will provide readers few information about the robo-advisory firms based in India. This is the gap that was found from previous papers and articles, on the geographical context. The current research paper will be providing readers a clear view of the perception of the investors and performance of the robo-advisory. The robo-advisors based in India are Arthayantra, Bigdecision, Fundsindia and Scripbox and MyUniverse ZIPSIP (Singh & Kaur, 2017). Robo-advisory is an emerging trend in Indian firms where each and every individual investors can get the advantage from its automated financial advice in a cost effective manner.

The primary focus was to study the potential investor's perception of this innovative advisory platform, if they have been benefited out of this platform at present and whether they might accept this platform to invest their money in and obtain investment advice in the near future. This research has collected few information from one of the research papers named "robo-advisors for Portfolio Management'', wherein researchers did a survey by introducing the mean variance model to their target audience in the U.S context (Park et al., 2016). The current paper focuses on a different methodology against the previous research papers. The perception survey of Indian investors towards robo-advisors was introduced and implemented to grab information about investors currently using this innovative investment platform, percentage of people following traditional human advisory financial planning and whether people are embracing the robo-advisory investment platform.

Hypothesis Formulation

The amateur investors have found robo-advisors as their best companions for initiating their investment needs. A study suggests that the potential investors decide upon the robo-advisors through referrals. 18% of the total advisory is based on these referrals through family and friends (Park, 2018). The investors are really eager to share their perception on robo-advisory because of their experience and the efficiency showed by the robo-advisors. It is observed that the robo-advisory services has gained familiarity and popularity in the countries who are early adopters. It is also seen that 46% of the robo-advisors were inspired by respective human advisors (Shaw, 2018). This encouragement advocated the hypothesis that there is a strong and favorable linkage between perception and robo-advisory.

H_1: Investor's perception has a significant impact on Robo advisory.

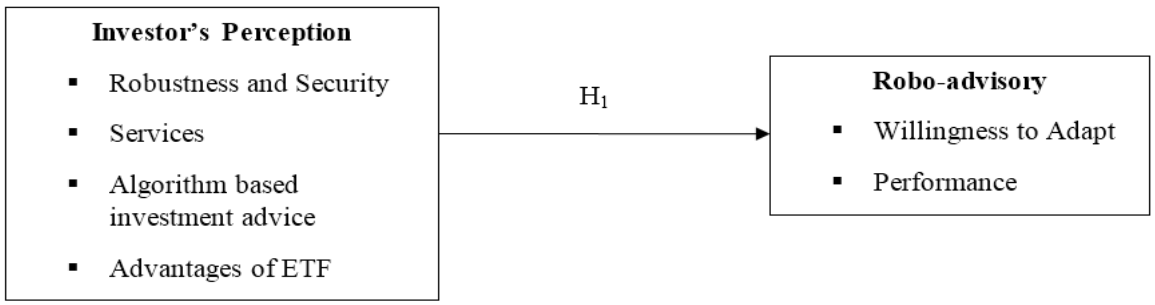

Figure 1: Hypothesized Model

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III. METHODOLOGY

Robo-advisors are growing at a greater pace in the developed countries than the developing nations. So the purpose of this research was to study and analyze whether individuals, companies, wealth management firms, banking and insurance companies are aware of this efficient investment platform and to bring into light the perception of the potential investors of this innovative platform.

The methodology used in this regard was the perception survey aided by a structured questionnaire. Through this structured questionnaire approach this paper was able to gather information about the perception of individuals towards this innovative advisory platform, their investment plans, pre-retirement plans, whether they will prefer robo-advisors over the human advisors and if they have been benefited of using the robo-advisory services.

The methodology introduced in this study was very much straight forward in its approach. The perception study on an individual basis would never be a bread and butter task, however, at the end, technology create its brand positioning in the mind of every individual. We distributed structured questionnaire among 250 potential investors and collected 167 responses.

The target sample of 250 was taken into account for gathering sound information, for a better understanding and clarity as well. The potential investors from whom the data was collected, on an average, have five to six years of experience in the field of wealth management and business analytics. We gathered good data and information in this process which made our study intense and rigorous.

Sampling and Data collection

The primary focus was to target the majority of investors from IT sectors, analytics firms and general public on a lighter note for whom the perception survey was conducted. Through this survey, overall idea about the demand and accessibility of the robo-advisory in India is achieved and whether people are finding it beneficial.

As it was a perception study, a structured questionnaire was presented before the potential investors. It was not a kind of ‘Yes or No’ question, rather a close ended questionnaire where individual opinions were taken into account. The sampling technique used in this study was purposive in nature.

This was our strategy and when it comes to implementing a strategy, a very crucial and challenging phase of a research work, proper segmentation and target becomes highly necessary. This study collated and analyzed few responses on the perception towards the robo-advisory platform, and then moved forward for a closer and wider view of the robo-advisory platform by targeting a sample of 250 investors.

After the implementation of the structured questionnaire and collection of 168 valid responses regarding this innovative investment platform, the research was taken forward by performing a regression analysis on the collected responses. The aforementioned essentials were taken into account as far as the perception study was concerned.

Data Analysis

An impact assessment was proven by the implication of the regression analysis showing the relationship of the items between the independent variable (input) set with dependent variables (output) set.

The primary intention of this study was to examine the significance level of the predictors and their strength to validate the robo-advisory services. The ANOVA test was performed to examine the significance of the results.

Table 1: Reliability statistics

Cronbach's Alpha	*N of Items*
.898	18

The structured questionnaire comprised of 18 predictors for assessing the perception of the investors and performance of robo-advisory services (table 1). The items 5, 6, 7, 11, 12, 13, 14, 15, 16, 17 and 18 contributed extensively to the outcome.

The reliability is checked by conducting Cronbach's alpha test. The reliability of 0.70 or higher is considered acceptable (Nunnally, 1978) but, in this study, the alpha coefficient is 0.898 for 18 items which shows that the reliability of the responses have relatively high internal consistency.

Table 2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.910
Bartlett's Test of Sphericity	Approx. Chi-Square	1339.238
	Df	153
	Sig.	.000

The Table 2 shows the KMO value as 0.910 which represents that the inputs are distinct and provides a good insight of the performance of robo-advisors as output.

The Bartlett's test of sphericity shows the significance value as .000, which is highly significant and the chi-square value and degrees of freedom being 1339.238 and 153 shows that the data collected is sufficient to carry out the research.

Table 3: Model Summary

Model	*R*	*R Square*	*Adjusted R Square*	*Std. Error of the Estimate*
1	.878[a]	.771	.752	.39083

The R Square value in the table 3 suggests that the predictors which is basically the perceptions of the investors can describe the recommendations towards robo-advisory by 77.1%. The 13 items of the predictors were regressed onto the outcome to find the strength of the relationship and it is found to be more than 50% (Nunnally, 1978).

Table 4: ANOVA

Model		*Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*
1	Regression	79.295	13	6.100	39.932	.000[b]
	Residual	23.524	154	.153		
	Total	102.819	167			

The table 4 shows that the test of hypothesis through analysis of variance is significant. The F statistics suggest a higher value of 39.932 and at a significance level of 0.000. The null hypothesis is thus rejected and an alternate hypothesis is accepted.

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Table 5: Regression Analysis

Model			Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error	Beta		
	1	(Constant)	-.093	.198		-.469	.640
Q1		How often do you invest?	.023	.026	.039	.880	.380
Q2		You prefer "Do It Yourself "Investment instead of a consultant's advice.	-.010	.035	-.012	-.278	.781
Q3		You prefer a Human Advisor over robo-advisor to guide you through the investment process.	-.043	.026	-.070	-1.661	.099
Q4		Investment in ETF, rather than Mutual Funds, is your first priority that robo-advisors use.	.061	.043	.069	1.427	.156
Q5		As far as investment is concerned, do you think robo-advisorsy platform is the best one to invest your money in?	.088	.044	.114	2.010	.046
Q6		You feel that introduction of robo-advisory services in Indian firms was a right decision.	.160	.053	.183	3.029	.003
Q7		The service fees for human advisors is more as compared to the robo-advisors.	.073	.036	.094	2.015	.046
Q8		You give preference to a low cost investment platform that robo-advisors provide.	.063	.044	.071	1.426	.156
Q9		What is your perception of human advisors in the field of financial advisory?	.010	.045	.011	.233	.816
Q10		You are a time saver and prefer automation.	.051	.043	.060	1.200	.232
Q13		Do you think algorithm based investment advice can outperform the traditional advisory services?	.189	.044	.235	4.317	.000
Q14		According to you Exchange Traded Fund based investment has been adding advantages to robo-Advisors.	.234	.051	.256	4.604	.000
Q16		If you are a fresh investor, would you like to seek robo-advice at a low cost?	.095	.033	.140	2.904	.004

The Table 5 indicates that these 13 items have contributed to the output, but of these 13 predictive items major contribution was from items Q6, Q13, Q14 and Q16. These items are significant with beta values being 0.003, 0.235, 0.256, 0.140.The items Q1, Q2, Q3, Q4, Q8, Q9 and Q10 are insignificant with value more than 0.05 (significant p value). The highly significant items are Q13 and Q14 with value being 0.000. The output robo-advisory is a dependent variable as it is dependent on the aforementioned items. Here we represent the variables and predictors by a linear regression equation.

Output robo-advisory = constant + $\sum$ (beta * Significant items) + $\sum$ (std. errors)

$$= - (0.093) + \{(0.140*Q16) + (0.256*Q14) + (0.235*Q13) + (0.183*Q6)\} + (0.033Ɛ16 + 0.051Ɛ14 + 0.044Ɛ13 + 0.053Ɛ6)$$

IV. DISCUSSION

Our study highlighted an empirical analysis through which we performed a perception survey and gathered good responses. The responses being collected has validated our study. This study targeted the IT sector individuals,

investors and potential investors. The targeted sample generated healthy responses. The responses collected from the respondents provided validity to the output; the fair perception of investors towards the robo-advisors and performance of robo-advisory. Robo-advisory has been doing a great job in the field of investment. Through this innovative platform the potential investors can avail an automated algorithm-based financial advice in a cost-effective manner. In this way it becomes very attractive for small and young investors with a less asset size. It has been successful in outpacing the human advisors, who demand for a high volume Asset under Management (AUM) with a high processing fees. Taking into account the banking sector these platforms can be proved to be an effective tool in assessing the credit worthiness of the customers and most importantly this is a time saver.

This paper has a message for the investors those routinely investing in certain stocks, bonds, mutual funds that Exchange Traded Fund could be a better option for them for parking their hard earned money. Investors with small asset size can invest their money in ETFs without any fear as the ETF based investment is highly flexible, cost-effective and safe. Robo-advisory has brought into light the features of the ETF based investment which investors can follow without any hassle. Robo-advisory is a proper solution young and small investors' problems as they are not provided investment advice by the traditional advisors because of their small asset size. Basically, we are accustomed with actively managed investment as compared to passively managed investment. Therefore, robo-advisory has clearly justified the passive index fund investment by validating the use of the ETF. As far as validation of the robo-advisory was concerned, the choice of robo-advisory investment platform, Indian firms providing robo-advisory services, service fees of robo-advisors, algorithm based investment zone, advantages of ETF to robo-advisory and cost-effective investment zone are the inputs or the predictors that has significantly supported the output; unique investment advice, speed, security, safety and reliability of robo-advisory, outcome generated through this innovative platform. The regression analysis was performed on the generated outcome and the significance level of the predictors were taken into account. The items with 0.000 significance, contributed majorly to the output robo-advisory. In this way, all the data were analyzed thoroughly as far as impact analysis was concerned.

The beta factor of the aforementioned predictors was also analyzed to increase the strength of the inputs towards the output. Out of the 13 predictors, the items with negative significance and very less beta value was not taken into account in this study as they deviated from the output. Finally, the desired items were shown in a linear regression equation.

V. CONCLUSION

The algorithm based investment is making robo-advisors more competitive than the traditional human advisors as far as investment is concerned. This paper brings into light the performance of the robo-advisory platform and acceptance of this platform by the investors, which was validated through a perception study. Robo-advisory has been a very demanding platform not only in the developed countries, but also in Asian nations as far as investment and other financial services are concerned. This platform is considered to be a good zone to enjoy the benefits out of financial advice and services on a wider and closer study, which was found out from the investors and potential investors' perception study. The regression analysis on the collected response was effectively performed, which

reflected a significant relationship between the inputs and the output robo-advisory. This paper has witnessed that majority of the investors are preferring to invest in this automated algorithm-based platform vis-à-vis human advisory and have been generating sound outcome. The emerging trend of the robo-advisors and Exchange Traded Fund (ETF) based investment platform has been a matter of choice for maximum investors and for those willing to invest in the near future. As far as demographic sensitivity is concerned responses from male and female investors boosted the performance report of the robo-advisory platform against human advisors.

This paper could only manage to target the samples of Bangalore because of the stipulated time frame and convenience sampling technique was used. Secondly, the study has incorporated regression analysis for analyzing the impact of perception of potential investors on the robo-advisory which can further be enhanced by a comparative analysis between the potential and the existing investors. Getting information from the potential investors was a bit challenging task as a result of which the responses were limited to the one mentioned above. This paper took into account the sampling technique followed by a linear regression, but the future analysis can be done using other advanced analytical tools. Due to the stipulated time frame, the sample size was limited to 167 in number, so the increase in sample size may impact the outcome significantly and enhance the robustness of the research in the future course of time. The current paper deals with the investors' perception and performance of robo-advisors. With the efficient implementation of the robo-advisory, Indian investors could witness an innovative investment platform in the near future.

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