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The first mutual fund in the U.S., Massachusetts investor’s trust, was set up in Britain and the U.S., resembled this investment trust and other investment trusts which were afterward set up in Scotland by scattering the investment over a number of different stocks. This investment trust and other investment trusts which were afterward set up in Britain and the U.S., resembled today’s close – ended mutual funds. The first mutual fund in the U.S., Massachusetts investor’s trust, was set up in March 1924. This was the open – ended mutual fund.

A B S T R A C T

The history of mutual funds dates support to 19th century when it was introduced in Europe, in particular, Great Britain. Robert Fleming set up in 1868 the first investment trust called Foreign and colonial investment trust which promised to manage the finances of the moneyed classes of Scotland by scattering the investment over a number of different stocks. This investment trust and other investment trusts which were afterward set up in Britain and the U.S., resembled today’s close – ended mutual funds. The first mutual fund in the U.S., Massachusetts investor’s trust, was set up in March 1924. This was the open – ended mutual fund.

I. Introduction

Mutual fund is the pool of the money, based on the trust who invests the savings of a number of investors who shares a common financial goal, like the capital appreciation and dividend earning. The money thus collect is then invested in capital market instruments such as shares, debenture, and foreign market. Investors invest money and get the units as per the unit value which we called as NAV (net assets value). Mutual fund is the most suitable investment for the common man as it offers an opportunity to invest in diversified portfolio management, good research team, professionally managed Indian stock as well as the foreign market, the main aim of the fund manager is to taking the scrip that have under value and future will rising, then fund manager sell out the stock. Fund manager concentration on risk – return trade off, where minimize the risk and maximize the return through diversification of the portfolio. The most common features of the mutual fund unit are low cost. The below I mention the how the transactions will done or working with mutual fund.

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A fund is “mutual” as all of its returns, minus its expenses, are shared by the fund’s investors. The Securities and Exchange Board of India (Mutual Funds) Regulations, 1996 defines a mutual fund as a ‘a fund established in the form of a trust to raise money through the sale of units to the public or a section of the public under one or more schemes for investing in securities, including money market instruments’. According to the above definition, a mutual fund in India can raise resources through sale of units to the public. It can be set up in the form of a Trust under the Indian Trust Act. The definition has been further extended by allowing mutual funds to diversify their activities in the following areas:

- Portfolio management services
- Management of offshore funds
- Providing advice to offshore funds
- Management of pension or provident funds
- Management of venture capital funds
- Management of money market funds
- Management of real estate funds

A mutual fund serves as a link between the investor and the securities market by mobilizing savings from the investors and investing them in the securities market to generate returns. Thus, a mutual fund is akin to portfolio management services (PMS). Although, both are conceptually same, they are different from each other. Portfolio management services are offered to high net worth individuals; taking into account their risk profile, their investments are managed separately.

In the case of mutual funds, savings of small investors are pooled under a scheme and the returns are distributed in the same proportion in which the investments are made by the investors/unit-holders. Mutual fund is a collective savings scheme. Mutual funds play an important role in mobilizing the savings of small investors and channelizing the same for productive ventures in the Indian economy.

The first mutual fund in the US, Massachusetts Investors’ Trust, was setup in March 1924. This was the first open-ended mutual fund. The stock market crash in 1929, the Great Depression, and the outbreak of the Second World War slackened the pace of growth of the mutual fund industry. Innovations in products and services increased the popularity of mutual funds in the 1950s and 1960s.

The first international stock mutual fund was introduced in the US in 1940. In 1976, the first tax-exempt municipal bond funds emerged and in 1979, the first money market mutual funds were created. The latest additions are the International bond fund in 1986 and arm funds in 1990. This industry witnessed substantial growth in the eighties and nineties when there was a significant increase in the number of mutual funds, schemes, assets, and shareholders. In the US, the mutual fund industry registered a tenfold growth in the eighties (1980-89) only, with 25% of the household sector’s investment in financial assets made through them. Fund assets increased from less than $150 billion in 1980 to over $4 trillion by the end of 1997.

Mutual funds have organization structure as per there Security Exchange Board of India guideline; Security Exchange Board of India specified authority and responsibility of Trustee and Assets Management Companies. The objectives are to controlling, to promoted, to regulate, to protect the investor’s right and efficient trading of units. Operation of Mutual fund start with investors saves their money on mutual fund, than Mutual Fund manager handling the funds and strategic investment on scrip.
“Mutual Funds are collective savings and investment vehicles where savings of small (or something big) investors are pooled together to invest for their mutual benefit and returns distributed proportionately.”

Despite being available in the market less than 10% of Indian households have invested in mutual funds. A recent report on Mutual Fund Investments in India published by research and analytics firm, Boston Analytics, suggests investors are holding back from putting their money into mutual funds due to their perceived high risk and a lack of information on how mutual funds work. There are 46 Mutual Funds as of June 2013.

Mutual fund investments are sourced both from institutions (companies) and individuals. Since January 2013, institutional investors have moved to investing directly with the mutual funds since doing so saves on the expense ratio incurred. Since 2009, online platforms for investing in Mutual funds have also evolved.

II. Literature Review

(S. Poornima, 2013) In this research paper an attempt is made to analyze about the performance of the growth oriented equity diversified schemes by using Sortino ratio. 102 growth oriented equity diversified schemes which were performing during the period April 2006 to March 2011 were selected for the study. This research paper clearly reveals the fact that careful evaluation using appropriate performance measure will lead the investor in selecting the best funds.

(Palanisamy, 2012) studied Investment Pattern in Debt Scheme of Mutual Funds. Data collected through interview schedule and statistical tools used such as percentage analysis, weighted ranking analysis and Chi-square analysis. The study concludes that debt scheme are suitable for genuine investors as there exists a variety of investors needs depending on purpose, expectations and risk taking abilities.

(Jatinder Loomba, 2011) Evaluates the performance and growth of Indian mutual funds vis-à-vis the Indian equity market. The overall analysis finds that Nifty returns outperformed Franklin Templeton Large Cap Equity Scheme returns. Kruskal Wallis H-test was applied to know whether the returns significantly differ or not and the results indicated that the returns of schemes don’t differ significantly.

(Sahil Jain, 2012), analysis of Equity Based Mutual Funds in India attempted to analyze the performance of equity based mutual funds. The analysis has been made using the risk-return relationship and Capital Asset Pricing Model (CAPM). The overall analysis finds that HDFC and ICICI have been the best performers, UTI an average performer and LIC the worst performer which gave below- expected returns on the risk-return relationship.
(Kuah Kean Lam, 2008), had studied on the Malaysia’s unit trust performance during the up and down market conditions has shown that the Malaysia mutual fund performance from 1996 to 2000 reported that the manager’s poor timing ability contributes significantly to the fund’s 18 negative overall performance. Such results suggest no economic benefit accrues to the average fund manager involving in market timing activities.

(Shantanu Mehta, 2012), made a household investor survey with the objective to provide data on the investor preferences on MFs and other financial assets. The findings of the study were more appropriate, at that time, to the policy makers and mutual funds to design the financial products for the future.

(McDonald, 1997), McDonald examined the performance of funds, during the period from 1960 to 1969, in light of their objectives. He found that the objectives did explain a portion of performance as measured by excess returns over the market return. However, he also found large overlaps in performance from objective to objective.

(Sarita Bahl, 2012), Debasish (2009) studied the performance of selected schemes of mutual funds based on risk and return models and measures. The study covered the period from April 1996 to March 2005. The study revealed that Franklin Templeton and UTI were the best performers and Birla Sun life, HDFC and LIC mutual funds showed poor performance.

(Sharpe, 1966) in order to evaluate the risk-adjusted performance of mutual funds introduced the measure known as reward-to-variability ratio (Currently Sharpe Ratio). With the help of this ratio he evaluated the return of 34 open-end mutual funds in the period 1945-1963. The results showed that to a major extent the capital market was highly efficient due to which majority of the sample had lower performance as compared to the Dow Jones Index. Sharpe (1966) found that from 1954 to 1963 only 11 funds outperformed the Dow-Jones Industrial Average (DJIA) while 23 funds were outperformed by the DJIA. Study concluded that the mutual funds were inferior investments during the period. Results also showed that good managers concentrate on evaluating risk and providing diversification.

(Carlson, 1970), conducted a research to analyze the predictive value of past results in forecasting future performance of mutual funds for the period 1948-1667. The author also examined the efficiency of market and identified the factors related to the fund performance. First of all he constructed indices for three types of mutual funds (Diversified common stock, Balanced, Income) and compared these indices with the market indices. The author also concluded that past performance showed little predictive value and that the performance was positively related to the availability of new cash resources for investment purposes.

III. Research Methodology

This chapter introduces the research outline of the study. The chapter begins with an overview of the Mutual Fund industry in India, and benefits and disadvantages of the Mutual fund Scheme, their growth and different. Besides that, this chapter also includes the problem statement, research objectives and research questions. The key terms and significance of the study will also be highlighted.

Mutual Fund (MF) is a form of collective investment that allow investors with similar investment objectives to pool their savings, which are then invested in a portfolio of securities or other assets managed by investment professionals.

Saving is the surplus of income over expenditure and when such savings are invested to generate more
money, it is called investment. With the development of capital market, investment in stocks became a good option for generating higher returns. However, greater risk and lack of knowledge about the movement of stock prices were also associated with them. Therefore, mutual funds emerged as an ultra modern method of investment to lessen the risk at low cost with experts’ knowledge.

This study differs from a few past studies in several ways. It uses a much larger and more recent data base with a greater number of objective categories. The data were subjected to more rigorous (strong) statistical tests than were used before. Two time periods were examined to see if fund performance for objective categories changed in comparison to other categories over time. We used the objectives stated in the prospectuses of the funds; whereas, the prior studies used objectives based in part on judgement.

In India, Mutual Fund industry started in 1963 with the formation of Unit Trust of India (UTI). It was the.

- **First phase (1964–1987)** of Indian mutual fund industry during which UTI enjoyed a complete monopoly.
- **Third phase(1993–2003)** started with the entry of private sector and foreign funds.
- **Fourth phase(since February 2003 till date)**, is the age of consolidation and growth.

As on 31 March 2012, there are 44 mutual fund companies with 1309 schemes and wide variety such as Open-Ended, Close-Ended, Interval, Growth, Income, Balanced, Equity Linked Savings Scheme. Because of the large number of mutual fund companies and schemes, retail investors are facing problems in selecting right funds.

### IV. Analysis

**Reliance Mutual Fund & Tata Mutual Fund**

![Graph showing the Net Asset Value (NAV) for Reliance and Tata Mutual Funds](image)

Dependent variable is TATA mutual fund, 1 independent variables Reliance mutual fund, 60 cases.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St. Error</th>
<th>t-value</th>
<th>p(2 tail)</th>
</tr>
</thead>
</table>

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Peer review under responsibility of Emil Kaburuan.
ISSN (electronic): 2620-6269/ ISSN (printed): 2615-4021 . Hosting by Research Parks All rights reserved.
Intercept     1.9411908           4.6018784       .4218257         0.675
VAR1           .3163712           0.0165189        19.152099      <.001

R-Square = 0.8635            Adjusted R-Square = 0.8611
Cohen's f-square = 6.3242, a large effect size.

Analysis of Variance to Test Regression Relation

Source           Sum of Sqsdf        Mean Sq           F                   p-value
---------------------------------------------------------------------------
Regression     15769.147           1         15769.147        366.8029         <.001
Error                2493.4658          58        42.99079
---------------------------------------------------------------------------
Total               18262.612          59

A low p-value suggests that the dependent variable TATA mutual fund
may be linearly related to independent variable(s).

MEAN X =      273.83          S.D. X =       51.675          CORR XSS =    157549.0
MEAN Y =      88.573          S.D. Y =       17.594          CORR YSS =    18262.56
REGRESSION MS=   15769.147             RESIDUAL MS=      42.991
Pearson's r (Correlation Coefficient)= 0.9292

The linear regression equation is:
VAR 2 TATA mutual fund =  1.941191  +  0.3163712 * VAR1 Reliance mutual fund
Test of hypothesis to determine significance of relationship:
H(null): Slope = 0   or  H(null): rho≠ 0    (two-tailed test)
t = 19.15   with   58 degrees of freedom   p <= .001
F tabular value is =2.81

Note: A low p-value implies that the slope does not = 0.
Conclusion: H0 is Rejected.
Dependent variable is Birla sun life mutual fund, 1 independent variables Reliance mutual fund, 60 cases.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St. Error</th>
<th>t-value</th>
<th>p(2 tail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-4.062241</td>
<td>2.8263297</td>
<td>-1.437285</td>
<td>0.156</td>
</tr>
<tr>
<td>VAR1</td>
<td>.1061709</td>
<td>.0101454</td>
<td>10.464953</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

R-Square = 0.6538 Adjusted R-Square = 0.6478
Cohen's f-square = 1.8882, a large effect size.

Analysis of Variance to Test Regression Relation

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sq</th>
<th>df</th>
<th>Mean Sq</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1775.9282</td>
<td>1</td>
<td>1775.9282</td>
<td>109.51525</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Error</td>
<td>940.54331</td>
<td>58</td>
<td>16.216264</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total 2716.4715 59
A low p-value suggests that the dependent variable Birla sun life mutual fund may be linearly related to independent variable(s) Reliance mutual fund.

\[
\begin{align*}
\text{MEAN } X &= 273.83 \quad \text{S.D. } X = 51.675 \quad \text{CORR } XSS = 157549.0 \\
\text{MEAN } Y &= 25.011 \quad \text{S.D. } Y = 6.785 \quad \text{CORR } YSS = 2716.469 \\
\text{REGRESSION MS} &= 1775.928 \quad \text{RESIDUAL MS} = 16.216
\end{align*}
\]

Pearson's r (Correlation Coefficient) = 0.8086

The linear regression equation is:

\[ \text{VAR2 Birla sun life mutual fund} = -4.062242 + 0.1061709 \times \text{VAR1Reliance mutual fund} \]

Test of hypothesis to determine significance of relationship:

H(null): Slope = 0 \quad \text{or} \quad H(null): \rho \neq 0 \quad \text{(two-tailed test)}

\[ t = 10.46 \quad \text{with} \quad 58 \text{ degrees of freedom} \quad p \leq .001 \]

Note: A low p-value implies that the slope does not = 0.

Conclusion: H0 is rejected.

Reliance Mutual Fund and L&T Mutual Fund

Dependent variable is VAR2 L&T mutual fund, 1 independent variables Reliance mutual fund, 60 cases.
Variable       Coefficient        St. Error         t-value          p(2 tail)
---------------------------------------------------------------------------
Intercept       -5.145255        1.1174709     -4.604375          <.001
VAR1            .0634169         .0040113       15.809686         <.001
---------------------------------------------------------------------------
R-Square = 0.8117            Adjusted R-Square = 0.8084
Cohen's f-square = 4.3094, a large effect size.

Analysis of Variance to Test Regression Relation

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sq</th>
<th>df</th>
<th>Mean Sq</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>633.61299</td>
<td>1</td>
<td>633.61299</td>
<td>249.94616</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Error</td>
<td>147.02988</td>
<td>58</td>
<td>2.5349979</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>780.64287</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A low p-value suggests that the dependent variable VAR2 may be linearly related to independent variable(s).

---------------------------------------------------------------------------
MEAN X =      273.83    S.D. X =       51.675    CORR XSS =    157549.0
MEAN Y =      12.22     S.D. Y =        3.637      CORR YSS =    780.643
REGRESSION MS=     633.613             RESIDUAL MS=       2.535
---------------------------------------------------------------------------
Pearson's r (Correlation Coefficient) = 0.9009
The linear regression equation is:
VAR2 L & t mutual fund = -5.145255 + 6.341688E-02 * VAR1 Reliance mutual fund
Test of hypothesis to determine significance of relationship:
H(null): Slope = 0  or  H(null): rho ≠ 0  (two-tailed test)
   t = 15.81   with   58 degrees of freedom   p <= .001
   Note: A low p-value implies that the slope does not = 0.
Conclusion: H0 is rejected.

Reliance Mutual fund and ICICI prudential Mutual Fund

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St. Error</th>
<th>t-value</th>
<th>p(2 tail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-27.90647</td>
<td>30.089136</td>
<td>-.9274601</td>
<td>0.358</td>
</tr>
<tr>
<td>VAR1</td>
<td>1.0732182</td>
<td>.1080078</td>
<td>9.9364884</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

R-Square = 0.6299  Adjusted R-Square = 0.6236
Cohen's f-square = 1.7023, a large effect size.

Analysis of Variance to Test Regression Relation

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sqsdf</th>
<th>Mean Sq</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>181463.99</td>
<td>1</td>
<td>98.733802</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Dependent variable is VAR2 ICICI prudential mutual fund, 1 independent variables Reliance mutual fund, 60 cases.
A low p-value suggests that the dependent variable VAR2 may be linearly related to independent variable(s).

\[
\begin{align*}
\text{MEAN } X &= 273.83 \\
\text{S.D. } X &= 51.675 \\
\text{CORR } XSS &= 157549.0 \\
\text{MEAN } Y &= 265.973 \\
\text{S.D. } Y &= 69.874 \\
\text{CORR } YSS &= 288063.0 \\
\text{REGRESSION MS} &= 181463.989 \\
\text{RESIDUAL MS} &= 1837.911
\end{align*}
\]

Pearson's r (Correlation Coefficient) = 0.7937

The linear regression equation is:

\[
\text{VAR2ICICI prudential mutual fund} = -27.90648 + 1.073218 \times \text{VAR1Reliance mutual fund}
\]

Test of hypothesis to determine significance of relationship:

\[H(null): \text{Slope} = 0 \quad \text{or} \quad H(null): \rho \neq 0 \quad (\text{two-tailed test})\]

\[t = 9.94 \quad \text{with} \quad 58 \quad \text{degrees of freedom} \quad p \leq .001\]

Note: A low p-value implies that the slope does not = 0.

Conclusion: \(H_0\) is rejected.

TATA Mutual Fund and Birla sun life Mutual Fund

![Graph showing NAV comparison between TATA and Birla sun life Mutual Funds]
Dependent variable is VAR2 Birla sun life mutual fund, 1 independent variables TATA mutual fund, 60 cases.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St. Error</th>
<th>t-value</th>
<th>p(2 tail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-5.982452</td>
<td>1.9225255</td>
<td>-3.111767</td>
<td>0.003</td>
</tr>
<tr>
<td>VAR1</td>
<td>0.3499142</td>
<td>0.0212964</td>
<td>16.430712</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

R-Square = 0.8232  Adjusted R-Square = 0.8201
Cohen's f-square = 4.6546, a large effect size.

Analysis of Variance to Test Regression Relation

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sq</th>
<th>df</th>
<th>Mean Sq</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>2236.0734</td>
<td>1</td>
<td>2236.0734</td>
<td>269.9683</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Error</td>
<td>480.3981</td>
<td>58</td>
<td>8.2827258</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2716.4715</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A low p-value suggests that the dependent variable VAR2 may be linearly related to independent variable(s).

MEAN X = 88.573  S.D. X = 17.594  CORR XSS = 18262.56
MEAN Y = 25.011  S.D. Y = 6.785  CORR YSS = 2716.469
REGRESSION MS= 2236.073  RESIDUAL MS= 8.283

Pearson's r (Correlation Coefficient) = 0.9073

The linear regression equation is:

VAR2 Birla sun life mutual fund = -5.982451 + 0.3499142 * VAR1 TATA mutual fund

Test of hypothesis to determine significance of relationship:
H(null): Slope = 0 or H(null): rho ≠ 0  (two-tailed test)

\[ t = 16.43 \text{ with } 58 \text{ degrees of freedom } p <= .001 \]

Note: A low p-value implies that the slope does not = 0.

Conclusion: H0 is rejected.

**TATA Mutual Fund and L&T Mutual Fund**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St. Error</th>
<th>t-value</th>
<th>p(2 tail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-4.774484</td>
<td>.9128613</td>
<td>-5.23024</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>VAR1</td>
<td>.1918717</td>
<td>.010112</td>
<td>18.974615</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

R-Square = 0.8613    Adjusted R-Square = 0.8589
Cohen's f-square = 6.2075, a large effect size.

**Analysis of Variance to Test Regression Relation**

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sq</th>
<th>df</th>
<th>Mean Sq</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
</table>

Dependent variable is VAR2 L & T mutual fund, 1 independent variables TATA mutual fund, 60 cases.
A low p-value suggests that the dependent variable VAR2 may be linearly related to independent variable(s).

Pearson's r (Correlation Coefficient) = 0.928

The linear regression equation is:

VAR2 L & T mutual fund = -4.774484 + 0.1918717 * VAR1 TATA mutual fund

Test of hypothesis to determine significance of relationship:

H(null): Slope = 0  or  H(null): rho ≠ 0  (two-tailed test)

  t = 18.97  with  58 degrees of freedom  p <= .001

  Note: A low p-value implies that the slope does not = 0.

  Conclusion: H0 is rejected.

  TATA Mutual Fund and ICICI Prudential
Dependent variable is VAR2 ICICI prudential mutual fund, 1 independent variables TATA mutual fund, 60 cases.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St. Error</th>
<th>t-value</th>
<th>p(2 tail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>17.193855</td>
<td>33.284001</td>
<td>0.5165802</td>
<td>0.607</td>
</tr>
<tr>
<td>VAR1</td>
<td>2.8087413</td>
<td>0.3686962</td>
<td>7.6180378</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

R-Square = 0.5001 Adjusted R-Square = 0.4915
Cohen's f-square = 1.0006, a large effect size.

Analysis of Variance to Test Regression Relation

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sq</th>
<th>df</th>
<th>Mean Sq</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>144074.25</td>
<td>1</td>
<td>144074.25</td>
<td>58.0345</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Error</td>
<td>143988.6</td>
<td>58</td>
<td>2482.5621</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>288062.86</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A low p-value suggests that the dependent variable VAR2 may be linearly related to independent variable(s).
MEAN X = 88.573  S.D. X = 17.594  CORR XSS = 18262.56
MEAN Y = 265.973  S.D. Y = 69.874  CORR YSS = 288063.0
REGRESSION MS= 144074.251  RESIDUAL MS= 2482.562

Pearson's r (Correlation Coefficient)= 0.7072

The linear regression equation is:
VAR2 ICICI prudential mutual fund = 17.19386 + 2.808741 * VAR1 TATA mutual fund

Test of hypothesis to determine significance of relationship:
H(null): Slope = 0  or  H(null): rho ≠ 0  (two-tailed test)
t = 7.62  with  58 degrees of freedom  p <= .001
Note: A low p-value implies that the slope does not = 0.
Conclusion: H0 is rejected.

Birla sun life Mutual Fund and L&T Mutual Fund

Dependent variable is VAR2 L & T mutual fund, 1 independent variables Birla sun life mutual fund, 60 cases.
Variable     Coefficient      St. Error      t-value         p(2 tail)
---------------------------------------------------------------------------
Intercept     .8558086         .9673468     .8846968      0.380
VAR1         .4543835         .0373496      12.16569      <.001
---------------------------------------------------------------------------
R-Square = 0.7185          Adjusted R-Square = 0.7136
Cohen's f-square = 2.5518, a large effect size.

Analysis of Variance to Test Regression Relation

Source            Sum of Sq    df    Mean Sq    F          p-value
---------------------------------------------------------------------------
Regression     560.85451 1       560.85451       148.00402    <.001
Error               219.78836 58      3.7894545
---------------------------------------------------------------------------
Total               780.64287 59

A low p-value suggests that the dependent variable VAR2 may be linearly related to independent variable(s).

MEAN X =      25.011    S.D. X =        6.785    CORR XSS =    2716.469
MEAN Y =      12.22      S.D. Y =        3.637    CORR YSS =     780.643
REGRESSION MS=     560.855             RESIDUAL MS=       3.789

Pearson's r (Correlation Coefficient)= 0.8476
The linear regression equation is:
VAR2 L & T mutual fund  =  0.8558086  +  0.4543835 * VAR1 Birla sun life mutual fund

Test of hypothesis to determine significance of relationship:
H(null): Slope = 0   or  H(null): rho ≠ 0    (two-tailed test)
          t = 12.17   with   58 degrees of freedom   p <= .001
Note: A low p-value implies that the slope does not = 0.
Conclusion:  H0 is rejected.
Dependent variable is VAR2 ICICI prudential mutual fund, 1 independent variable Birla sun life mutual fund, 60 cases.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>St. Error</th>
<th>t-value</th>
<th>p(2 tail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>103.55755</td>
<td>27.179405</td>
<td>3.8101477</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>VAR1</td>
<td>6.4938707</td>
<td>1.049406</td>
<td>6.1881397</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

R-Square = 0.3977  Adjusted R-Square = 0.3873
Cohen's f-square = 0.6602, a medium effect size.

Analysis of Variance to Test Regression Relation

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Sqdf</th>
<th>Mean Sq</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>114554.57</td>
<td>114554.57</td>
<td>38.293073</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Error</td>
<td>173508.28</td>
<td>2991.5221</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total 288062.86 59
A low p-value suggests that the dependent variable VAR2 may be linearly related to independent variable(s).

---

**MEAN X = 25.011  S.D. X = 6.785  CORR XSS = 2716.469**

**MEAN Y = 265.973  S.D. Y = 69.874  CORR YSS = 288063.0**

**REGRESSION MS= 114554.573  RESIDUAL MS= 2991.522**

---

Pearson's r (Correlation Coefficient)= 0.6306

The linear regression equation is:

\[
\text{VAR2 ICICI prudential mutual fund} = 103.5575 + 6.493871 \times \text{VAR1Birla sun life mutual fund}
\]

Test of hypothesis to determine significance of relationship:

H(null): Slope = 0  or  H(null): \( \rho \neq 0 \)  (two-tailed test)

\[ t = 6.19 \text{ with 58 degrees of freedom} \quad p < .001 \]

Note: A low p-value implies that the slope does not = 0.

Conclusion: \( H_0 \) is rejected.

---

Dependent variable is \( \text{VAR2 ICICI prudential mutual fund} \), 1 independent variables \( \text{L&T mutual fund} \), 60 cases.
Variable | Coefficient | St. Error | t-value | p(2 tail)  
----------|-------------|-----------|---------|------------
Intercept | 66.809763   | 17.011201 | 3.9273984 | <.001      
VAR1      | 16.297874   | 1.3351127 | 12.207114 | <.001      

R-Square = 0.7198    Adjusted R-Square = 0.715  
Cohen's f-square = 2.5692, a large effect size.  

Analysis of Variance to Test Regression Relation  

| Source       | Sum of Sqs | df  | Mean Sq    | F           | p-value  
|--------------|------------|-----|------------|-------------|----------
| Regression   | 207354.91  | 1   | 207354.91  | 149.01364   | <.001    
| Error        | 80707.944  | 58  | 1391.5163  |             |          
| Total        | 288062.86  | 59  |             |             |          

A low p-value suggests that the dependent variable VAR2  
may be linearly related to independent variable(s).  

MEAN X = 12.22    S.D. X = 3.637    CORR XSS = 780.643  
MEAN Y = 265.973   S.D. Y = 69.874   CORR YSS = 288063.0  
REGRESSION MS= 207354.911      RESIDUAL MS= 1391.516  

Pearson's r (Correlation Coefficient)= 0.8484  
The linear regression equation is:  
VAR2 ICICI prudential mutual fund = 66.80976 + 16.29787 * VAR1L&T mutual funds  

Test of hypothesis to determine significance of relationship:  
H(null): Slope = 0   or  H(null): rho ≠ 0   (two-tailed test)  
t = 12.21   with   58 degrees of freedom   p <= .001  
Note: A low p-value implies that the slope does not = 0.  

References:  


Mechanism of Improving the Innovative Activity of The Insurance Services Market in Uzbekistan

Khamraev Mekhroj Sirojkhonovich

Abstract
The article is devoted to the issues of innovative development of the insurance services market, which is based on the need and importance of creating innovations in the industry. Barriers to the introduction of innovations have also been identified and appropriate ways for their elimination have been identified.

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Introduction
As a result of monitoring insurance risks not only in case of force majeure, but also in the trends of scientific, technical and socio-economic development of the country, the volume of insurance services in our country is constantly growing. This sector makes a significant contribution to strengthening the material well-being of mankind in various conditions. In order to ensure the rapid development of the national insurance market, the introduction of new types of insurance services, the introduction of new innovative insurance products and the development of traditional products in high demand, effective work is being done to expand the volume, range and quality of insurance services. Innovative activities to create innovative product in any field, at different stages of the production process to implement the options become, as a result, the complete satisfaction of the needs of the community and minimized production costs can be achieved.

Methodology
At the beginning of the twenty-first century, a distinctive feature of the world economy was the introduction of new advances in science and technology into production, which serve to increase labor...
productivity in the material sphere through the formation, use and adaptation of new knowledge. Today, the innovative basis for the development of society, so that scientific and technological progress, as well as the socio-economic development of the country as a condition of innovative process need for regulation and management of the processes will occur, ultimately operating in the introduction of new technology and production methods of tooth to ensure the competitiveness of each economic entity to be achieved.

One of the main objectives of the economic policies being implemented in the country is ensuring the rapid development of the economy and competitiveness. To do this, it is necessary to restructure production in basic industries, implement structural changes in industries and regions through the active introduction and modernization of new and modern technologies, ensure interconnectedness and balance between them, diversify the national economy, increase production capacity. In order to achieve this goal, the wide and effective use of modern scientific achievements, the introduction of the most advanced and latest technologies in production, the strengthening of attention to the development of innovations in all sectors and industries of the national economy, relying on innovations and experiences abroad should be considered and implemented. It is important not only to introduce, but also to achieve high levels of national practice and achievements, to use all the opportunities and potential for this.

Results

The role of insurance in the country's economy is determined by the share of insurance premiums in GDP. The figure below shows the percentage of insurance in GDP in some countries as of 2019, and realistically depicts the state of development and popularity of the industry.

The picture shows that the highest level of insurance in the world is in the United States, and the need for insurance services in the country is a secondary need. The next places are occupied by Western European and Asian countries. The picture shows the low level of demand for insurance services in Uzbekistan, which is being consistently reformed by the government. In 2019, in accordance with the instructions of the President, a Roadmap for the accelerated development of the insurance market of Uzbekistan was developed. According to him, instructions were given to rapidly increase the share of insurance services in GDP, the amount of insurance premiums per capita, the total amount of insurance premiums, the authorized capital, assets and investments of insurers. At the same time, tasks have been set to improve the quality of insurance services.

Table 1

<table>
<thead>
<tr>
<th>№</th>
<th>Name of indicators</th>
<th>2018 y</th>
<th>2019 y</th>
<th>2020 y</th>
<th>2021 y</th>
<th>2022 y</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Share of insurance services in GDP (percent)</td>
<td>0,4</td>
<td>0,5</td>
<td>0,6</td>
<td>0,7</td>
<td>0,8</td>
<td>2,0 times</td>
</tr>
<tr>
<td>2.</td>
<td>Amount of insurance premium per capita (thousand soums)</td>
<td>50,0</td>
<td>65,0</td>
<td>88,0</td>
<td>114,0</td>
<td>148,0</td>
<td>3,0 times</td>
</tr>
<tr>
<td>3.</td>
<td>Total insurance premiums (trillion soums)</td>
<td>1,6</td>
<td>2,1</td>
<td>2,9</td>
<td>3,8</td>
<td>5,2</td>
<td>3,3 times</td>
</tr>
</tbody>
</table>
Achieving these goals requires, first of all, a radical reform of the insurance market, first of all, to study what products the population needs, to offer them comprehensive quality and convenient services, to provide a wide range of insurance through the establishment of regional branches of insurance companies. As for the insurance services market with innovative settings v wellbeing, is now interested in is required and available through the new insurance services as an enrichment and the purpose of the formation of the interest of clients.

The share of insurance premiums in GDP in the world averaged 6.35%, which is 16 times lower than the 0.4% in Uzbekistan. Insurance companies have been instructed to increase this figure, and today they are carrying out reforms to provide the population with the necessary and needed products. Today, the per capita insurance premium in Uzbekistan is 5 Euros, and in the world - 847 Euros. Their comparative analysis was 169 times. The approved roadmap aims to increase this figure to 3 times by 2022. In order to ensure the fulfillment of these tasks, insurance companies are actively working to strengthen their financial base, expand coverage and use innovative methods of service and increase the attractiveness of insurance products, the use of innovative marketing research.

In order to increase competitiveness, attract potential customers, ensure the financial stability of insurers, local insurance companies are taking certain measures to improve market performance by introducing various innovations. In accordance with the requirements of the insurance supervisory authority, the factors ensuring the financial stability of the insurance company are the adequacy of own capital, insurance reserves formed to meet the obligations to the insured, economically justified insurance rates and reinsurance system [5].

1. The insurance product is determined by the set of basic and ancillary services provided to the insured at the conclusion of the insurance contract. The subject of product innovation in insurance is the main insurance service, and the change in ancillary services will be associated with technological innovation. The innovative development of insurance activities aimed at the creation of new insurance products can be considered in detail. On the one hand, the insurance company is taking steps to create an entirely new insurance product for foreign and domestic practice. On the other hand, the insurer improves the insurance product already used in the market by giving new qualities. Thirdly, an insurance company borrows a product that is unknown in that insurance market and promotes it as a novelty for that market. In the country’s insurance market, in most cases, a new insurance product is a modification of an old product that has the new qualities needed to meet the growing needs of society.

When talking about innovations in the insurance product, it is necessary to focus on improving the
quality of customer service in the event of an insured event, which requires the introduction of new advanced technologies. The provision of insurance services involves the establishment of a stable partnership between the insurer and the insured, which is directly related to ensuring the quality of the insurance product during its validity period. Achieving the quality necessary to continue cooperation with the insured will allow the client to provide "innovative" support in the implementation of the insurance contract. In a large insurance company with a large customer base, it is necessary to innovate with the latest information technology to provide high quality customer service. Innovations aimed at developing new channels for the sale of insurance services are most in demand in the competitive environment of the local insurance market. It is necessary to create new ways of selling the product in order to increase sales at the stage of introduction of the insurance product into the market. This is one of the promising methods and organization of the use of Internet trade. Internetning active, taking into account the development of the insurance companies have Web sites, you need to give attention to the development and modernization of their time. In addition to the increase in sales, the growth of insurer profits is positively affected by the decline in business costs achieved through e-commerce.

2. All new ideas that meet the principles of innovative development of insurance activities, but do not reach the level of corporate innovation strategy, should undoubtedly be encouraged by the management of the insurance company. Whether or not the innovation is applied to the company, management should reward employees who have been involved in the development and implementation of the innovation. To do this, it is necessary not only to implement an innovative strategy, but also to develop a system of accounting for new ideas aimed at optimizing the core business processes of the company. We propose to develop an automated corporate system for recording new ideas. Every employee of an insurance company who wants to improve the business processes of their site or the company as a whole should have the opportunity to present their ideas and discuss them with representatives of the interested structures of their company. In order for employees to form ideas on how to optimize not only their own activities, but also the company's activities, it is necessary to explain to each employee the company's innovative development strategy and explain its goals and objectives. Depending on the score of the new idea given by the employee, the author of the idea should receive a certain amount of material reward or be included in the list of prospective employees who applied quickly. The Project Committee described above should work to analyze and evaluate new ideas. All this allows us to carry out high-quality work on the implementation of innovative processes that ultimately ensure the maximum use of the intellectual potential of the insurance company.

The choice of innovative development strategy should be based on the search and strengthening of market positions that will ensure the long-term competitive advantage of the insurance company. This can be achieved by maintaining a leading position as a new insurance product offered to customers, which requires it to be unique in the insurance market or to have attractive features for the insured and potential insured. In order for an insurance company to achieve competitive advantages, it is necessary to ensure the availability of highly qualified innovators, knowledge of the characteristics of insurance interests of certain groups of clients, business reputation in the insurance market, use of modern information technologies and an effective resource management system.

3. In order to improve the market of insurance services in Uzbekistan, expand access to services, simplify the system of insurance policies, on December 14, 2020 the Cabinet of Ministers adopted a Resolution "On additional measures to improve the provision of electronic insurance services." An e-policy is an insurance policy that is purchased online and circulated electronically. According to the decision, the "E-policy" will initially operate under the compulsory third party liability insurance of vehicle owners and will be available for purchase from March 1, 2021.
"E-polis" has the following advantages:

1. First of all, time and money are saved. This is enough to connect to the internet to buy an insurance policy, the insurance company is not required to go to, as well as the opportunity to pay online. In addition, the cost of the policy is expected to be slightly lower than the current types of insurance.

2. There is no need to worry about losing an electronic document, i.e. a policy. After the policy, "E-polis" the insurer at any time to check their mobile device or download. To do this, the SMS notification number or e-mail address is sufficient.

3. "E-polis" registration fraud ka met (in the form of paper to a minimum the possibility of purchase of the policy likely to be fooled by the insurance agent).

4. Only a few, or almost one insurance company headquarters are in remote areas for guests to choose the best insurance company, and that any insurance company with the participation of the agents directly contract with the opportunity arise and s ug'urta reward system created an electronic calculator provided information is automatic based on.

At the same time, insurance companies in staff salaries as well as agents to mediate rights costs declined significantly. Therefore, the application of this system in the framework of voluntary types of insurance also gives effective results, i.e. the improvement of innovative activities of insurance companies, including the expansion of insurance, simplification of the insurance process, saving operating costs.

Indeed, the reduction of the cost burden of insurers will inevitably be reflected in its financial results. In the context of modernizing the economy, they are striving to create innovations that not only reach out to customers in a comprehensive way and increase their interest, but also strengthen their financial position and increase their competitiveness. In the course of the research, we suggested that insurance companies can also create innovations by introducing new qualities to traditional insurance products, in particular, the application of the procedure for collecting collateral from customers in the insurance of liability for late payment of customs duties. It is known that customs duties are levied on imported goods entering the country from abroad. Insurance companies are responsible for insuring liability for delays in these payments, with the insured being the owner of the imported goods. It was proposed to introduce a procedure for collecting collateral from customers when concluding insurance contracts due to the high incidence of insurance events in this type of insurance, ie the frequent non-payment of customs duties, which adversely affects the financial condition of the insurer. Any client who pledges at the time of insurance will try to pay their obligation on time, and this has paid off. In return for the collateral, the insured clients were able to pay customs duties on time, which had a positive impact on the financial results of the insurance company. The incidence of insured events, i.e. non-payment of customs duties on time, decreased by 5 % in 2020 compared to 2019.

Discussion

1. Insurance companies around the world are taking certain steps to improve their operations by attracting more policyholders and applying various innovations to increase their competitiveness. Today, taking into account the specifics of the domestic insurance market and there is an objective need to improve the quality of organization of insurance activities, increase the efficiency of insurance activities on the basis of its innovative development, which allows maximum use of investments.

2. The insurance activity of insurance companies transition to a customer-oriented business model, digitalizing of insurance business, new products, sales of insurance products, the introduction of
digital technology and the use of new channels and new ways to satisfy insurance claims envisaged. The dissertation proposed innovations aimed not only at serving the interests of the insured, but also to ensure the financial stability of insurance companies.

3. Among the factors hindering the active application of innovations in the field of insurance in Uzbekistan are: underdeveloped insurance market infrastructure, underdeveloped research, lack of marketing opportunities, limited innovation offers by insurers, low confidence in the insurance company, financial literacy and financial decisions, lack of acceptance authority, lack of insurance literacy, overuse of traditional insurance products and trade channels by the insured, etc.

**Conclusion**

In our opinion, innovations in the field should be mainly aimed at increasing the scope of insurance services, their efficiency, full compliance of insurance products with customer demand, shortening service life, increasing the profitability of insurance companies and expanding their business.

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2. Resolution of the Cabinet of Ministers of the Republic of Uzbekistan "On additional measures to improve the procedure for providing electronic insurance services." December 14, 2020
5. Annual reporting data of the insurance company JSC "KAPITAL SUGURTA".
6. Resolution of the President of the Republic of Uzbekistan dated August 2, 2019 No PP-4412 "On measures to reform the insurance market of the Republic of Uzbekistan and ensure its rapid development."
8. 02.20.-FINANCE 4412 i 5780.pptx data
9. Appendix 2 to the Resolution of the President of the Republic of Uzbekistan dated August 2, 2019 No.PQ-4412
Effective Ways of Using Water with Information Systems

Sultonov Akmal Obidovich
Jizzakh Polytechnic Institute, Uzbekistan

ABSTRACT
The article discusses complex ways of optimal use of water resources, depending on indicators of efficiency in agriculture. The main aspects of the structure of the information system of water use in agriculture are analyzed and systematic conclusions are drawn about the extent to which it is possible to achieve strategic goals.

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Introduction
Today, in the countries of the world, including in Uzbekistan, the issues of efficient and rational use of water resources are becoming an urgent problem. Global climate change, population growth and economic sectors, especially agricultural production, require an increase in demand for water resources from year to year, and as a result, the annual deficit of water resources increases. Solving these issues requires improving water resources management systems and mechanisms for the effective use of water resources, as well as consistent reforms to develop and modernize water facilities.

Literature review
From the analysis of scientific research of scientists, it can be concluded that the problem of improving the use of information systems in the efficient use of water in the management of irrigation systems is one of the main strategic directions of economic development, especially agriculture.
Scientific and practical issues of implementation in water resources management have been studied by foreign economists. Solutions to thematic problems were conducted by Richard Coeks, Philip Langarts on the topic “Improving the efficiency of water use in irrigation”, Enda O’Connell on the topic “Adaptation of water systems to climate and socio-economic systems”, Jaime Sainz-Santamaria, Adan L., Martinez -Kruz in the topic “Problems of investing in irrigation systems”, Olufunke Kofi, Tilaksun Amede in the topic “Issues of organizing the directions of water resources management strategy”

Main part

The area of irrigated land in our republic is 4.3 million hectares, with an average of 90-91% of total water resources used in agriculture, and the rest - in other sectors of the economy. As a result of global climate change, the area of glaciers in Central Asia has decreased by 30 percent over the past 50-60 years. If the temperature rises by 20°C, the volume of glaciers will decrease by 50%, and with an increase of 40°C, by 78%. It is estimated that by 2050, water resources are expected to decrease by 5% in the Syrdarya basin, and by 15% in the Amu Darya basin. The total water shortage in Uzbekistan in the period up to 2015 amounted to more than 3 billion cubic meters, by 2030 this figure may reach 7 billion cubic meters, and by 2050 – 15 billion cubic meters (Fig. 1). Analyzes show that climate change will further exacerbate water scarcity in Uzbekistan, increase the duration and frequency of droughts, as in 2000, 2008, 2011, 2014 and 2018, and create serious difficulties in meeting the economy's water needs.

1. Dynamics of water supply of the Sirdarya and Amu Darya rivers, million m$^3$

Today, the rational use of water resources is an urgent problem for agriculture in many countries. In Uzbekistan, on the one hand, there is a shortage of water resources, on the other, we see the real state of water use technologies and irrigation systems in many sectors of agriculture, their efficiency is not used at the level of modern requirements in comparison with developed countries. Analyzing the state of affairs for 2019, the country has introduced economical irrigation methods for 37 thousand 767 hectares. Of these, 34 thousand 445 hectares were used drip irrigation, 1 thousand 122 hectares - sprinkler irrigation, 2 thousand 200 hectares - pulsar irrigation. In cotton growing alone, as a result of the introduction of drip irrigation on 12 thousand hectares of areas during the growing season, water

![Graph showing dynamics of water supply](image_url)
savings of 40.3 million m$^3$ were achieved. The saved water is directed for re-irrigation of more than 6 thousand areas. ha.

**Results**

Thus, based on the above, we propose to use the following scheme to create an information system aimed at setting goals for the efficient and optimal use of water in agriculture and identifying solutions, as well as solving issues in water resources management. We called this scheme the logical-functional structure of the information system for rational water use.

The above diagram explains the fundamental features of the structure of the information system for the use of water resources in agriculture.

Analysis of information and communication technologies (ICT) and the degree of use of these technologies in the departments of irrigation systems of the Jizzakh region shows that in the region all departments of irrigation systems are equipped with computer technology. While some have 1-2 personal computers, others have 7-8 computers. Most of the irrigation system departments use ICIT only to automate accounting reports. Insufficient development of software for the automation of technological processes directly related to the organization of water management of irrigation system departments is the main reason that impedes the use of computer technologies in the operation of irrigation networks.

2. The structure of the information system for the use of water resources in agriculture

Thus, based on the above, we propose to use the following scheme to create an information system aimed at setting the problem of efficient and optimal use of water in agriculture and determining options for its solution, as well as on issues of water resources management; we call this diagram a logical-functional structure of an information system for the effective use of water.
We explain the fundamental features of the functioning of the structural structure of the information system of water use in agriculture as follows: as the main component of this structure, we take "Indicators of natural water resources" (1-block). In this block, predictive and real annual indicators of the volume of potential water resources available in nature are formed. Along with the fact that these indicators are the main source for the "Indicators of the irrigation system plan" (block 2), on the basis of precisely these indicators in the block "Strategic indicators in world agricultural practice" (block 10) using indicators (data) on the potential distribution water resources of the world in agricultural production, data are formed for comparative analysis in the region under consideration.

Due to the fact that the indicators of block 2 are formed on the basis of the indicators of block 1, on the basis of the "Technical indicators of irrigation systems" (Block 5), the quality of the "economic resource" is taken, then, according to the capabilities of block 5, the indicators of Block 1 will become a "resource" in block 2, on this basis, indicators of its use are formed. The data generated in this way in block 2 are considered as data included in the "Adaptive block (change in planned indicators)" (block 7).

The indicators of the block "Indicators of the plan of water consumption" (block 8) are formed on the basis of the "Indicators of water consumption" (block 6), formed from the "Indicators of types of agricultural crops" (block 3) and "Indicators of agricultural sown areas" (block 4). At the same time, since the formation of indicators of block 3 is at the disposal of farms, they participate in the formation of indicators of block 8 as "multivariate" indicators.

The indicators of block 8 are the basis for the formation of "Indicators of gross water consumption of regional agricultural entities" (block 9) and are guides for the "Indicators of the adaptive block (change in planned indicators)" (block 7), that is, the formulation of adaptation questions is based on the data of this block. In addition, the data of block 7 is formed on the basis of the data of block 2 and on the basis of indicators reflecting the characteristics of the "boundary" indicators, i.e. limited technical and technological capabilities of block 5.

The main task of the "Adaptive block (change of planned indicators)" (block 7) is the formation of "Real indicators of water consumption" (block 11) on the basis of algorithmic (target) calculations formed on the basis of the above scheme. By algorithmic calculation, we mean the planned indicators of water use, methods for determining the actual volume of water consumption; This algorithm is used in the software for the operation of the information system for the use of water resources. Along with this, this algorithm also includes performing benchmarking calculations for block 12 scores based on block 10 scores.

It is very important that on the basis of agricultural economic indicators in Block 12, or systemic conclusions about the degree of attainability of strategic goals in relation to the indicators of Block 10, sufficiently acceptable decisions are made precisely on the basis of the functioning of the water use information system (based on the principle of operation of this scheme). This shows the importance of this system, the relevance of its development.
References


Digital Innovations in the Hotel Business: Analysis of Foreign Experience

Shirin Yakubovna Abdusaidova
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ABSTRACT
The purpose of this article is to describe and evaluate new hotel service innovations that deserve to be considered for implementation in hotel businesses. The paper is timely since hotel buildings are becoming increasingly interested in the development and deployment of new technologies, as well as the problems of improving the quality and competitiveness of services at hotel enterprises, the solution of which can be innovation. This article describes digital innovation advances that can be applied to hospitality businesses. The article also provides an aggregated calculation of the income and expenses of a hotel project using innovative technologies. In conclusion, it is said that innovations can and should be used to solve problems of attracting new and retaining existing customers, due to timely response to customer needs.

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At the moment, the hotel business and the entire tourist market are in a "shock" situation. All segments of the industry, all categories of consumers are affected. Globally, the coronavirus pandemic has led to the fact that the crisis of the hospitality industry has affected all countries of the world. This trend will continue even when countries begin to recover from the crisis, since the main priority of potential consumers of tourist services will be the restoration of the economic situation and their own solvency.

The populace is currently undergoing a rapid and mostly forced "digitalization." All nations, with the exception of Uzbekistan, have moved staff to remote operating mode, and the complete service is now available online. Many travel agents who are currently working in the home office format may continue to do so when the crisis is over. In this context, a new sort of tourism has emerged: online tourism. Entire destinations have switched to online platforms. This strategy of behavior, at first glance, contributes to reducing the competitive advantages of organizations and institutions, since it "gives" unique content for general use. On the other hand, such an action program allows you to advertise yourself so that the client has a desire to visit them in the long term. Thus, deferred demand is formed.
In a constantly changing external environment, the generation of new ideas is a prerequisite for the sustainable development of the hospitality industry. With the successful implementation of innovative solutions in the information economy, they can turn into a new service product, become the basis for the formation of long-term competitive advantages, improve the quality of service, automate business processes, become one of the sources of development of the hospitality industry, its driver. In addition, in the context of changes in the structure and dynamics of the tourism market, the need for innovation by hotel enterprises is especially relevant. In order to understand the role and value of innovation in the hotel business, the specifics of innovation are applicable to the hotel industry, as well as the types of digital innovation that exist in the global hotel market.

**Literature review**

I. Schumpeter's work "Theory of Economic Development" provided the first definition of innovation as an economic word, which is cited by practically all scholars of innovative processes. It was about "novel combinations" of developmental changes. "Each method of production denotes a specific combination," argues I. Schumpeter, "and different methods of production can only differ in the nature and degree to which they are combined." Each specific act of production is a specific combination for us [1, p. 72]. These "new combinations". According to Schumpeter, they appear due to changes in the development of the sphere of production and market economy.

The term "innovation" he defined as the commercialization of all new combinations based on:
1. the introduction of new goods and services;
2. the use of new materials and components (new sources of raw materials);
3. introduction of a new production method;
4. opening new sales markets;
5. the introduction of new organizational forms.

In other words, according to the given definition, innovation is the simultaneous manifestation of two worlds, namely, technology and business. When a change occurs only at the level of technology, I. Schumpeter calls it an invention. And only when business is involved in changes, they become innovations[2, p. 8].

In the broad sense of the word, innovations in the hotel industry are understood as new services, products, processes or ideas, as well as existing services, processes and ideas that are applied in new conditions [3] (Vila, Enz, Costa, 2012). Researchers agree that innovations can improve the quality of services offered by hotel enterprises, increase labor productivity and customer satisfaction, gain a larger market share and form a competitive advantage [4, 5] (Danilenko, Suranova, 2018; Johannesson, Olsen, Lumpkin, 2001). A review of the literature devoted to the use of innovations in the field of tourist and recreational services allows us to state a wide range of areas of scientific search.

In particular, the theoretical foundations of innovations in the field of hospitality are reflected in the works of Johnson P. [6] (Jones, 1996), Ottenbacher M. [7] (Ottenbacher, 2007), Hjalager A. [8] (Hjalager, 1997). The role of innovations in increasing the competitiveness of hotel enterprises is highlighted in [9-12] (Kondratskaya, 2012; Chistyakova, 2011; Pokhomchikova, Tarkhanova, 2016; Balashova, Popova, 2018).

The specifics of the use of innovations in the hospitality industry are presented in the studies of a number of domestic and foreign authors [13-16] (Ignatev, 2017; Enz, Siguaw, 2003; Orfila-Sintes, Mattsson, 2009; Rudchenko, 2014).
Results

The introduction of innovations is a key characteristic of modern business. The hotel industry is no exception to this tendency. A potential hotel customer is someone for whom information technology has become an integral part of his life. The adoption of technological advancements in hotels is primarily motivated by this.

Digital innovations in the hotel business can be divided into two categories. The first category includes innovations related to technical equipment for the internal and external operation of the hotel. These technologies allow to optimize and simplify the work of the hotel staff, as well as to facilitate access and use of the hotel services directly to the client himself. Currently, hotels are moving to a new level of booking, and use Saas technology, better known as "Cloud". This technology allows the systems to receive subscription information, as well as manage the sales and marketing department of the hotel.

In addition to the systems that allow you to manage the work of the hotel and carry out the interaction of employees with customers, there is technical equipment that ensures the comfort and safety of the hotel resident, as well as helps in the work of the service personnel. This equipment is the second category of digital innovations in the hotel business. Today, it is becoming increasingly difficult to attract customers, only with comfortable apartments and a convenient geographical location. It becomes necessary to have such a set of technical services as: satellite TV, free wireless Internet and this is not a complete set.

Over the past decade, the hotel business has undergone a huge upgrade due to the development of digital technologies. Technologies of hotel automation, online booking, gadgetization, electronic menus, cable TV, wireless Internet, environmental distribution and supply of light and energy, online check-in and checkout, digital keys, robotization and much more are being introduced. The hotel industry actively uses digital transformations and makes a profit from this by optimizing costs and improving hotel processes, achieving an increase in the quality of service, an influx of potential customers and an increase in the economic indicators of this industry [17].

In the service, hospitality and tourism industries, technological innovations are becoming an important source of development and growth, and currently survival. In this sense, the development and implementation of technological innovations in the full sense becomes a strategic weapon of hotel chains and independent hotel enterprises [18]. According to experts, at present, business in general and the hotel industry in particular have a high potential for digitalization [19]. Let's consider the popular areas of development of digital technologies in the field of hospitality.

Digital solutions in the field of hospitality optimize the work of hotel enterprises by replacing staff with gadgetized services and devices. There is a digital transformation of the business, which allows hotel companies to develop and introduce personalized and even customized offers to the market.

Even now, hotel applications for guests track the presence of a guest near the hotel, and send notifications about the readiness of the room directly to the guests' mobile phones, chats with hotel employees are relevant if there are unusual requests and questions that the hotel's website or application cannot answer.

Among the consumer trends is the development of voice assistants and virtual companions services designed to help tourists, potential and real customers of the hospitality industry solve current problems in a virtual form. People who are already used to digital assistants and chatbots are interested in virtual assistants who are ready to help in organizing the route, finding a means of accommodation (and, accordingly, booking it), the optimal food option, leisure activities, entertainment, and many others.

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Today, digital assistants in hotels can provide check-in support, provide useful information, and perform guest relation functions.

Augmented reality technologies were highly appreciated by the business in terms of stimulating sales, promoting the brand, attracting the attention of sophisticated customers. The development of virtual and augmented reality can radically change the process of choosing and making purchases of goods and services by customers. Virtual reality is not just a convenient option in the process of searching and obtaining information – it is also an impression, a new experience, a special pleasure that a person who uses such innovative tools gets. It is impossible to exclude the significance of the psychological and social significance of such decisions.

Smart technologies find their application in hotel room management and the process of obtaining additional services. The guest can set up a comfortable temperature regime for him, lighting, its power, use the services of a voice assistant. The system is also capable of recognizing guests by account in the application and managing the number by the saved data. The introduction of such innovations will increase the loyalty of guests and automate the process of preparing a room for arrival, according to possible preliminary wishes [20]. These technologies open up new opportunities for improving the activities of hotel enterprises, acting in their modified forms in the form of intelligent and intellectualized systems.

Intelligent and intellectualized systems in the field of hospitality. As already noted, many areas of human activity are being transformed under the influence of digital technologies, robotics and automation. More and more processes and operations require minimal human intervention, there are "smart" programs and effective gadgets. These changes are also characteristic of the modern hotel industry.

In an effort to make the guest's stay at the hotel comfortable, convenient, and often unforgettable, the management of the hotel enterprise today is helped by various innovative solutions. Very often, the hotel industry uses intelligent and intellectualized systems that have appeared thanks to the latest research on the capabilities of artificial intelligence. The great advantage of these systems is that they can analyze the situation and make decisions independently. Unlike intelligent systems, intellectualized systems require the support of a person (operator) making a decision.

Traditionally, robots that adopt human functionality were designed to perform only dangerous, dirty or monotonous work. However, the trend of recent years is the reorientation of artificial intelligence to perform activities that go beyond the so-called "DDD niche" ("dull–dirty–dangerous"). Today, robots are able to significantly improve the lives of ordinary people, provide technological processes.

The first autonomous robots for hotel enterprises were developed by the company "Savioke". Now they are used, for example, in Singapore at the Jen Hotel, as well as in Japan at the ShinagawaPrince Hotel (Tokyo). These robots deliver orders to guests' rooms, pick up luggage. They are able to bypass obstacles and get up to the charging station when necessary. The reception staff only load the required item into the robot and enter the number of the room to which the delivery is to be made.

Not so long ago, LG demonstrated its line of hotel assistants, robots that were developed specifically for commercial use in hotels, supermarkets and airports. These machines are equipped with a special sliding tray, with which they can bring food and drinks to the guest in the restaurant. There is also a robot carrier in this line. In addition to baggage delivery, the robot can also perform operations of accelerated check-in-check-out to the hotel and accept payment, saving the guest from waiting for his turn.
The Hilton Hotel together with IBM created the first of its kind robot concierge with artificial intelligence, Connie. The software built into the robot allows it to better recognize human speech. Most often, the robot is located in the lobby next to the reception. Here he helps to serve guests: greets them, answers their questions. The robot can give the necessary information about the hotel, advise sights or places outside it. The technology used in the creation of Connie made it possible to bring his artificial intelligence as close as possible to human. The more Connie interacts with people, the smarter he becomes.

In Japan, in the city of Sasebo (Nagasaki Prefecture), there is a HennaHotel (which literally translates as strange), which is serviced exclusively by robots. At the reception, the guest is met by a humanoid robot and a dinosaur robot. A female robot receives guests who speak Japanese, and a dinosaur communicates with English speakers. When registering, the technology of identification of a person is used, with its help, the number is opened. In this hotel you can meet a robot porter, a cleaner, and a cloakroom attendant. The rooms are equipped with temperature and motion sensors. The guest can configure additional parameters from the tablet that will be in the room. A small toy robot is waiting for the guest in the room, which will provide information about the weather and tell what time it is. You can also ask him to wake you up in the morning. In the future, the founders plan to build another 1000 such robotic hotels in different parts of the world. The only people in the hotel, except for the guests, are security personnel who use cameras to monitor the work of robots.

The use of various sensors (light, motion, temperature) by a hotel enterprise refers to the concept of "ambient intelligence" or Ambient Intelligence, as well as Internet of Things (Internet of Things). Such technologies are now actively used in the creation of smart homes. The first to introduce smart home technology was the Skypark hotel chain. Instead of a room key, here, when registering, guests are given a smartphone with all the settings. A person only needs to set the desired parameters of temperature, lighting, humidity, and the system does everything else itself. As you know, one of the biggest operating expenses of hotels is the cost of electricity. The sensors detect whether there is a person in the room or not, and turn off the light themselves. No more worrying about forgetting to turn something off.

All these innovations help the hotel company to improve the quality of customer service. Automation of some processes reduces the risk of errors caused by the human factor [21]. If robots take over some of the work functions, then ordinary hotel employees have more time to concentrate on individual service, satisfying the wishes of guests. In addition, robots that have not yet become something ordinary are also an element of marketing and attract new guests.

Today, robots still remain exotic in hotels. Despite the fact that the opinion that robots will soon replace people in the workplace is quite common, there is no need to fear this. Now we will need people who create the necessary content, specialists who serve robots.

Making a decision on the digitalization of the human resource management system at a hotel enterprise is a voluntary issue and depends on the capabilities and goals of a particular accommodation facility. Despite the fact that the automation of personnel management processes is associated with a number of difficulties, its advantages over the "classical" methods of organizing personnel records management are obvious. Competent use of digital platforms in the hotel business can not only contribute to improving the quality of service and staff efficiency, but also make a number of progressive changes in the position of the industry in the labor market in the long term.

**Conclusion**

Changing consumer demands and requirements, changing needs of the manufacturing process (outdated

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equipment, technologies), changes in the structure of the industry or market, and demographic changes are all drivers of innovation in hotel businesses.

New expertise in the fields of management and marketing allows you to implement new, more effective staff management and client acquisition strategies. The presence of a loyal customer base serves as the basis for a stable sales volume even in a crisis, and is also an important strategic competitive advantage.

In order to create a working loyalty program, you must:

1. conduct a preliminary study of the organization, customers and competitors’ personnel. The client becomes loyal to the company and its products gradually, so you need to create loyalty stages and monitor how customers moved from one stage to another.
2. the main goal of working with a client is a high level of service, and consumers should also feel that hotel services are addressed to them personally; if this is not the case, they go to competitors, and the hotel loses potential customers.
3. careful work with customer complaints is required, since the worst is the negative reviews of the hotel company's clients.
4. it is necessary to work responsibly with the client: the speed of service is closely related to consumers’ ideas about good service.
5. a hotel company should know what is valuable for customers, so you need to invest money in customer loyalty research, which will allow you to understand how the work of a hotel company satisfies the needs of customers.
6. it is necessary to organize the return of lost clients: it is 2 times more likely to return the old client than to find and persuade a new one.
7. it will be necessary to use various channels in order to serve the client well: clients often change communication channels, but everywhere they expect good service.
8. the hotel management should organize training of specialists engaged in working with clients.
9. to increase the effectiveness of the loyalty program, it is necessary to cooperate with partners, which gives control of the entire supply chain, it becomes possible to provide a high-quality service to the end consumer, respectively, the company has fewer competitors.

Proper competition management implies that the hotel management should know its strengths and weaknesses in each of the technologies discussed above, as well as similar indicators of the main competitors. Based on these data, it is necessary to prioritize the development and introduction of new products, assessing their economic efficiency. The company's product policy should be based on this information. Thus, it is necessary to attach great importance to innovative technologies. Managing innovative technologies does not require large costs compared to poor management, but it makes a significant contribution to profit. The best way to achieve good results is to plan a strategy for the development of a hotel enterprise based on a systematic analysis of competitors, consumers, and the technological profile of the hotel.

Thus, Innovative technologies allow you to attract new and retain existing customers, provide a quick solution to problems by responding to customer needs in a timely manner.
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Effects of Fertilization Quantities on the Development of Wine Varieties of Grapes

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Kayumov Bobir Sobirovich
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Abstract
The article examines the effect of fertilizer amounts on the development of fruiting branches of grape wine varieties. The experiments were performed on five variants in four varieties. In all of these varieties the highest result was recorded in the fourth variant (N140P110K80 kg pure). Even when fertilizer was applied in large quantities, it had a negative effect on the biological properties of the varieties.

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Introduction
An important biological feature of the vine is the length of the growing season and the long-term uptake of nutrients. It allows the judicious use of fertilizer standards to provide the vine plant with the necessary nutrients.

Fertilization is usually understood as a method of creating a reserve of nutrients in the soil to improve the overall condition of the soil, as well as the application of the main (large) part of fertilizers to the soil for good biochemical processes in plants and its normal growth and development (Temurov Sh. 2002) [4].

In viticulture, basic fertilization is even more important because the vine bush is a perennial plant with a well-developed root system and a more or less developed aboveground part of the bush. begins (Buzin N.P. 1963) [2] ..
By creating favorable nutritional conditions by applying mineral and organic fertilizers before the start of the growing season, it is possible to ensure rapid plant growth and rapid accumulation of green mass, which is necessary to increase the overall growth of the bush and get a high grape yield (Buzin 1962) [1].

The effectiveness of combining fertilization with growing season nutrition can be explained by the different nutrient requirements of the vine, as well as the ability to manage nutrients in accordance with the requirements of the vine in individual growth phases, taking into account all changes in the soil. In addition, the positive effect of nutrition may also be associated with an increase in the total amount of nutrients deposited in the vineyards (Malikov A. 2018) [5]

**Research methods.** The research was conducted in the experimental field of the scientific experimental enterprise Kibray "Sharob". Wine varieties studied experimentally were carried out on 20-year-old vine bushes. Experimental options 4 repetitions, 5 vines in each repetition were selected and given different amounts of mineral fertilizers (NPK).

Selection of experiments, placement of options was carried out in the generally accepted methods, statistical analysis of the data obtained Dospekhov B.D. [3].

**Research results.** According to the results of the study, in the fourth variant, i.e. when mineral fertilizer N140P110K80 kg / ha was applied, the development of fertile branches of the Hindogni variety showed the highest result (table).

> According to the results of the study, in the fourth variant, i.e. when mineral fertilizer N140P110K80 kg / ha was applied, the development of fertile branches of the Hindogni variety showed the highest result (table).

Even when too much and too little fertilizer was applied, it had a negative effect on the development of fertile branches. It was found that the total yield of the rod was 8% lower than that of the control variant in the amount of N80P50K30 kg / ha, and 1.3% lower in the amount of N160P130K100 kg / ha.

Influence of the amount of fertilizer on the development of fruiting branches of wine varieties (2016-2018)

<table>
<thead>
<tr>
<th>Norms of mineral fertilizers (in pur form)kg/ha</th>
<th>Harvested branches, in %</th>
<th>Number of grape heads in one crop,%</th>
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<tbody>
<tr>
<td></td>
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<td>Two crops</td>
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### Maysky cherny variety

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<th>Yield 3</th>
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### Rysling variety

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The Hungarian nutmeg variety also had the highest result in the fourth variant, with mineral fertilizers N140P110K80 kg / ha yielding 47.5% of single-yielding rod, 25.4% of double-yielding rod and 3.2% of three-yielding rod and 76.1% of total yielding rod. In this variant, the number of grape heads on a single crop branch was 1.31%.

In the fourth variant, the Maysky cherni variety also showed the following results based on its biological properties. The single-yielding rod was 45.6%, the double-yielding rod was 24.5%, the three-yielding rod was 2.4%, and the total yielding rod was 72.5%. Compared to the control variant, the single-yielding rod was 1.1%, the double-yielding rod was 1.0%, the three-yielding rod was also 1.1%, and the total yielding rod was 3.2% higher.

Maysky cherny navigation also had a negative impact on the development of its productive branches when very little and large amounts of mineral fertilizers were applied. When fertilized with N80P50K30 kg / ha, the single-yielding rod was 22%, the double-yielding rod 0.4%, the three-yielding rod 1.3% and the total yielding rod 3.9% lower than the control variant. Similarly, when a large amount of fertilizer was applied, the total yield rod decreased by 4.6%.

The highest result was recorded when fertilizing N140P110K80 kg / ha based on the amount of mineral fertilizers in the Riesling variety. Observations revealed that single-yielding rods accounted for 44.5%, double-yielding rods for 24.3%, triple-yielding rods for 3.4% and total yielding rods for 72.2%.

The results of the study showed that all the experimental varieties had more single- and double-fruited branches, and very few three-fruited branches. The amount of fertilizer was also found to have a very large effect on the vine plant, both when applied in small amounts and when applied in large quantities. Therefore, determining the optimal amount of mineral fertilizers is an important agro-technical measure in obtaining high yields.

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