

FORECASTING FAMILY HOUSEHOLD THROUGH TREND MODELING**Mukhitdinov Khudoyar Suyunovich**

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Abstract: Using econometric modeling technology in the digitalization of family handicrafts, the theoretical and methodological foundations of the transformation and development of handicrafts in the future have been improved. A mathematical apparatus for creating a complex numerical econometric model of craft development in the region has been developed.

Key words: Econometric model, mathematical apparatus, Household, Household, house hold man, empirical model, trend models.

I. Introduction

A number of studies are being carried out around the world to improve the methodological base for increasing the role of family crafts in the development of crafts, including in the following priority areas:

- assessment of trends in the development of family crafts in the national economy and substantiation of promising areas;
- increasing the role of family crafts in the system of employment and labor relations in the process of digital transformation;
- management, social capital, heritage and gender issues in family crafts;
- a systematic approach to identifying problems in family fisheries;
- improvement of organizational and economic mechanisms for the development of family crafts;
- assess the role of family crafts in the development of regions.

Based on the foregoing, it can be concluded that one of the most important factors in increasing the level of competitiveness of Uzbekistan with foreign handicraft enterprises is the creation of favorable conditions for the creation of a whole network of handicrafts.

II. Methods

The famous American economist J. Schumpeter[4] (1883-1950) in his book "The Theory of Economic Development" described the craftsman as an innovator. The scientist believes that crafts are the introduction of innovations that play an important role in the development of the capitalist economy, ensuring economic growth. "We are calling in artisans whose function is to introduce new combinations." The British economist Friedrich von Hein (1899–1984), winner of the Nobel Prize in Economics (1974), approached this problem differently.

According to him, the craftsman is not an activity, but a search for new economic opportunities, providing behavior [5]. The scientist interprets the craft as an activity.

Neither abroad nor we have yet a generally accepted definition of mastery. The American scientist Robert D. Hisrich said: "Household is the process of creating something new that has its own value, and an entrepreneur is a person who spends all the necessary time and days on it, takes all the financial, psychological and social risks, and is satisfied with money and achievement as a reward" [6], he said.

The theoretical institutional framework for digital mastery is a form that today can be traced back to the development of modern digital mastery. The institutional basis of the craft is a qualitative indicator that characterizes what is directly related to social institutions and is directly related to the study of the craft.

Institutional change, also known as institutional development, is a process of transformation that takes both quantitative and qualitative forms. These processes take place in interaction with various institutions - political, economic, social and others. The institutional environment is an environment in which metamorphoses take place, but at the same time they manifest themselves at the level of various institutions, and not in changes in rules and laws.

Resource theories and service theories are also widely used in research in this area[7]. Such a variety of theoretical approaches is useful for the scientific substantiation of the problems and phenomena occurring in the practice of family business. In this regard, Mukhitdinov Kh.S. and Juraev F. applied a macroeconomic model for the development of the national economy[8]. The authors hypothesized that business development under the influence of two factors indicates that the relationship between them is not linear, but is important as a factor that has a separate value. The research of Peterson and Distelberg has shown an interesting application of the general theory that lies on the boundary between human nature and the family system. As can be seen, early research in this area used a limited number of theories.

III. Results and Discussion

In our opinion, the author's definitions of " household" and "entrepreneurship" correspond to modern conditions and requirements of a market economy, which indicates an attempt to reveal its economic content. Of course, all of these definitions have their merits.

In our opinion, the main focus in the concept of development of craftsmanship is primarily to support family businesses with economic potential, to create favorable opportunities for the development of industries necessary for the industry and region, but with low profitability, and an economy operating in accordance with the directions and goals of the social and economic policy of the republic. It is necessary to focus on the tasks of stimulating the structures, establishing tax incentives for small enterprises producing regionally important products, expanding the system of leasing service and investment risk insurance, and providing conditions that pave the way for the use of bank loans by small business enterprises with limited financial capabilities.

The importance of craftsmanship in the national economy is related to its role in society and its functions in the family.

In recent years, private character theories have also been widely used in research on family entrepreneurship in household. In particular, agency theory is recognized as a general theory widely used in family business research. According to this theory, the boundary of the management relationship between the family business owner (proprietor) and its members is classified. Such complex management processes are classified on the basis of agency theory[9]. Specially developed theories such as the "family chain" in the study of family entrepreneurship[10], the sustainable family business theory (SFBT) which has been used in research since 2000[11], are also successfully used in the study of family entrepreneurship. In addition, new theories[12] have emerged that help to explain the different strategies in the interaction of family and business systems and the main priorities of family business that differ from other types of business.

Household is the cradle of our national-traditional values, the national spiritual heritage left by our ancestors. In our country, there are seven generations of successors of craftsmen who continue the thousand-year-old crafts of our masters. Household is our national product, which expresses the beauty in the heart of the craftsman through manual work. There are many master craftsmen in Kashkadarya region. The development of their crafts, the sale of their products and the increase of their income, the exchange of experience with the artisans of our regions, such as Fergana, Bukhara, and Namangan, where handicrafts are developed, the wide promotion of handicrafts in our distant mountainous regions, and at the same time, the artisans can increase their number of apprentices and help their apprentices to open their own business. at the same time, to increase the number of artisans, to create competition among artisans and to supply high-quality and cheap products to the domestic and foreign markets, to achieve and develop cheapness of handicraft products by increasing the quality and development of high-income residents of our region, to be employed even from home, and to sharply eliminate unemployment.[13]

In particular, the theories used in research in the field of family entrepreneurship can be divided into large groups according to institutional theoretical approaches[14] and theories of social economy[15].

Therefore, family entrepreneurship requires a comprehensive functional analysis, which can be reflected in a theoretical model of the relationship of family functions, their complementarity, continuity and "family functions - entrepreneurship - well-being". According to him, family functions stimulate entrepreneurship in the family, which ensures well-being.

Based on this, it is appropriate to consider the system of family functions as factors that ensure family well-being, and secondly, as an important condition for the decision of family business. Uzbek national crafts, which have been alive for centuries, are still a source of entrepreneurship and good income. Another important point is that the products created by craftsmen are displayed at trade fairs organized in a number of cultural centers and exhibition halls in the capital. We can proudly say that every craftsman who works hard and strives for innovation has a prosperous life and a full table. Such high attention and opportunities are the reason for the further expansion of the ranks of those who seek to learn a trade among young people.

Decree¹ of the President of the Republic of Uzbekistan No. PF-5242 of November 17, 2017 aimed at fully preserving and increasing the rich cultural heritage and historical traditions of the peoples of Uzbekistan, further development of national handicrafts, folk artistic and applied arts, and comprehensive support for citizens engaged in handicraft activities and implementation of comprehensive measures, on this basis, in order to ensure the employment of the population, especially young people, women and low-income families, defined the main directions of further development of national handicrafts in our Republic.

The emergence of mini technology allows the individual and high-quality production of goods in crafts. This can include the production and service of national headstones, national musical instruments, small equipment, various souvenirs.

A number of studies are being conducted in Uzbekistan to improve the methodological basis of increasing the role of family crafts in the development of handicrafts, including the following priority directions:

- assessment of trends in the development of family crafts in the economy and substantiation of promising areas;
- increasing the role of family crafts in the system of population employment and labor relations in the processes of digital transformation;
- management, social capital, heritage and gender issues in family crafts;
- a systematic approach to identifying problems in family crafts;
- improvement of organizational and economic mechanisms of family craft development;
- assessment of the role of family crafts in regional development.

A favorable microeconomic environment will be created in our country through the transformation of crafts. In particular, the legislation on the protection of private property and craft rights has been strengthened, the procedures for business registration, issuing licenses and permits for certain types of activities have been simplified, the state's interference in business activities has been limited, all forms and terms of reports submitted by craft entities will be shortened sharply, tax rates have been unified. done, a stable market mechanism will be formed that allows wide use of high demand material and technical resources. Figure 1.

Today, collecting information about handicraft business in the world markets, organizing archives, quick finding, forming statistics can lead to some difficulties, i.e. excessive work, time, and expenses.

Therefore, we are thinking about the creation of a business system base for the production of handicraft products, technology. In order to clarify the issue, the info logical model of the database for the information system created using the data of the integration of the master-apprentice system with enterprises will be as follows.

We believe that this focus comes from the following distinctive features of the craft, namely:

- the ability to quickly adapt to market demand and produce quality products;
- meeting the demand for goods and services necessary for the needs of the population in a relatively short period of time;
- the initial investment volume is relatively small;

¹ <https://president.uz/uz/lists/view/1255>

- opportunity to create new jobs soon and to help solve the employment problem;
- direct participation of the craftsman in the implementation of his tasks.

The current stage of the economic reforms implemented in Uzbekistan is characterized by the development of crafts and giving it wide economic freedom.

We define a linear regression equation as an econometric model of the development of craft activities in Kashkadarya region.

In our case, the overview of the four-factor linear regression equation is written as:

$$\hat{Y} = a_0 + a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 \quad (1)$$

Table 1

Statistical data on the volume of products developed by craft enterprises in Kashkadarya region and the factors influencing it (real values)

Years	Volume of products developed by craft enterprises (million soums) Y	Share of people employed in craft activities in small business and entrepreneurs (in percent) X ₁	Investments in craft activities (million soums) X ₂	Number of active craft enterprises (thousands) X ₃	The size of craft services (million soums) X ₄
2002	1040,6	2,83	394,18	0,283	275,1
2003	1310,4	2,91	585,24	0,306	337,6
2004	1529,6	3,17	735,73	0,336	407,4
2005	1873,2	2,97	885,89	0,378	468,3
2006	2410,8	2,99	994,32	0,403	602,7
2007	3057,6	3,32	1369,82	0,473	764,4
2008	3241,6	4,5	1495,91	0,509	795,4
2009	3595,2	4,6	1768,66	0,552	898,8
2010	4309,2	4,75	2365,43	0,649	1077,3
2011	5422,8	4,88	2682,18	0,665	1354,5
2012	6207,6	5,12	2941,99	0,798	1551,9
2013	7417,2	5,36	3482,25	0,816	1854,3
2014	9770,5	5,31	4736,78	0,828	2527,6
2015	11971,8	5,9	5727,27	0,855	2992,5
2016	14120,4	6,12	6598,32	0,869	3530,1
2017	16321,6	8,7	6996,16	0,888	3830,4
2018	18681,6	9,13	8981,54	0,958	4670,4
2019	22327,6	8,74	10103,08	0,971	5331,9

2020	30609,6	9,21	14716,15	0,992	7652,4
2021	39253,2	9,32	18412,48	1,117	9813,3

We build the empirical model using MS Excel

Table 2

Building a linear empirical model based on the volume of products and influencing factors developed by handicraft enterprises in Kashkadarya region

Regression statistics					
Multiple R	R- square	Normalized square	R- standard error	Observations	
0,999808683	0,999617403	0,999515377	232,9856526	20	
Analysis of variance					
	df	SS	MS	F	Significance F
Regression	4	2127363969	531840992,3	9797,684549	0,00000000
Remainder	15	814234,7149	54282,31432		
Total	19	2128178204			
	Coefficients		Standard error	t-statistic	P-value
Y- intersection	-617,9393807		221,7528035	-2,786613612	0,013828061
Variable X 1	286,9639174		73,83926673	3,886332166	0,001461415
Variable X 2	-0,871256267		0,406124698	-2,145292498	0,048707349
Variable X 3	-833,0880684		539,9548602	-1,542884655	0,143689759
Variable X 4	5,524631658		0,760329855	7,266098552	0,000000276

Using Table 2, we write expression (1) as follows:

$$\hat{Y} = -617,94 + 286,96 X_1 - 0,871 X_2 - 833,088 X_3 + 5,525 X_4 \quad (2)$$

-2,787
3,886
-2,145
-1,543
7,266

It can be seen from (2) that if the values determined by factor 3 are analyzed, the coefficient in front of X3 is insignificant ($|-1.543| < 2.1$); the hypothesis of linearity of the model is not fulfilled only by this factor ($p=0.14 > 0.05$). In all other cases, it can be noted that a qualitative empirical model has been built. Then we write the adequate condition of (2) as follows

$$\hat{Y} = -617,94 + 286,96 X_1 - 0,871 X_2 + 5,525 X_4 \quad (3)$$

At this point, it is appropriate to check that there is no autocorrelation in model (3), then we check it by the Darbin-Watson criterion:

$$DW = \frac{\sum_{t=2}^T (e_t - e_{t-1})^2}{\sum_{t=1}^T e_t^2} = \frac{\sum_{t=2}^T e_t^2 + \sum_{t=2}^T e_{t-1}^2 - 2 \sum_{t=2}^T e_t e_{t-1}}{\sum_{t=1}^T e_t^2} = 2 - 2 \frac{\sum_{t=2}^T e_t e_{t-1}}{\sum_{t=1}^T e_t^2} \approx 2(1 - \rho_1)$$

Here, is the correlation coefficient of the first order. Positivity according to this criterion is explained by the value of DW around 2.

We calculate the correlation coefficient of the first order for the selected factors, i.e. In that case, equality is appropriate. This means that the quality of the model is high.

According to model (3), we define trend models for exogenous factors of this model in order to calculate forecast indicators of economic growth of handicraft enterprises in Kashkadarya region. We use MS Excel for this:

Figure 3 shows the calculated trend models for forecasting the process of change of the share of people employed in craft activities in small business and entrepreneurship. According to the analysis of the generated trend model results, the quality of this linear model is quite high.

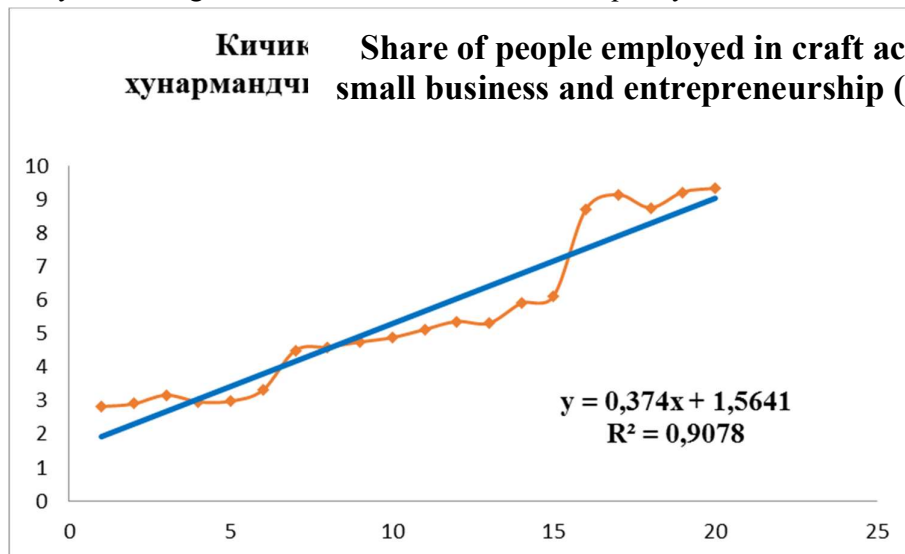


Figure 2. Share of people employed in craft activities in small business and entrepreneurship (in percent)

Figure 2 shows the calculated trend models for forecasting the process of investment in manufacturing activities. According to the analysis of the generated trend model results, the quality of this exponential model is quite high.

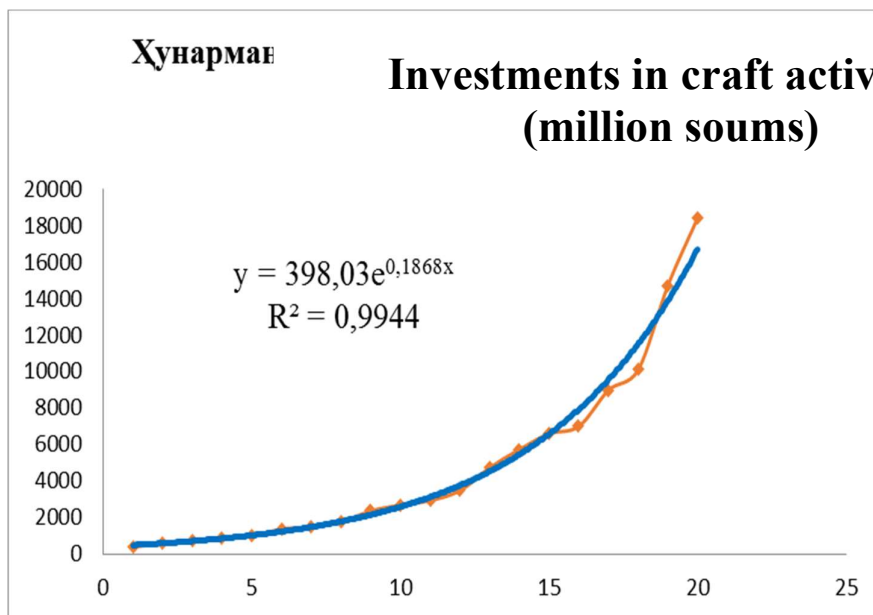


Figure 3. Investments in craft activities trend model

Figure 3 shows the calculated trend models for forecasting the process of investment in manufacturing activities. According to the analysis of the generated trend model results, the quality of this exponential model is quite high.

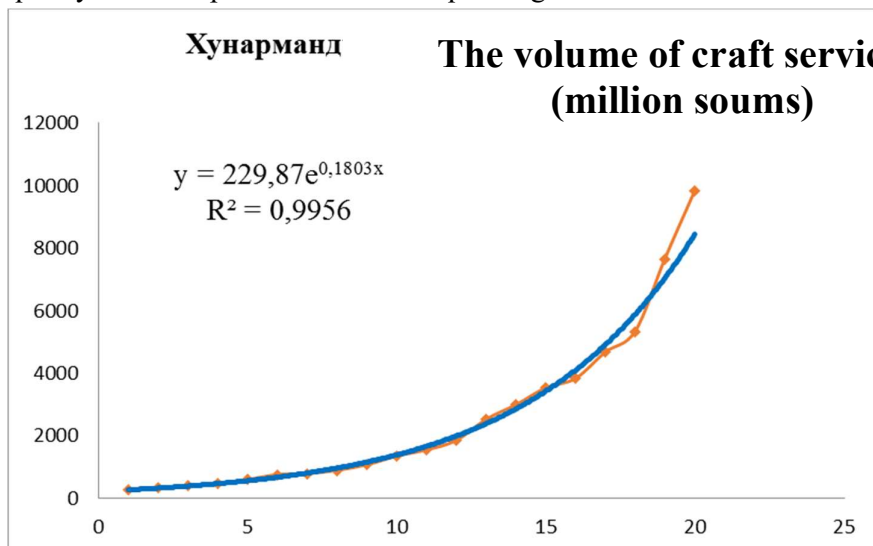


Figure 5. Estimated trend model for the volume of craft services

If we analyze the forecasts obtained based on the analysis of trend models calculated above and the results obtained from them, we can see this from Table 5.

Table 3

Forecast of the production volume and influencing factors developed by handicraft enterprises in Kashkadarya region

Forecast years	Volume of products developed by craft enterprises (million soums) Y	Share of people employed in craft activities in small business and entrepreneurship (in percent) X ₁	Investments in craft activities (million soums) X ₂	The size of craft services (million soums) X ₄
2022	40562,1	9,42	20117,14	10135,65
2023	48134,82	9,79	24248,92	12138,21
2024	57154,43	10,17	29229,31	14536,44
2025	67901,01	10,54	35232,61	17408,5
2026	80708,83	10,91	42468,9	20848,01
2027	95976,74	11,29	51191,43	24967,09

The analysis of Table 5 shows that according to the forecasts obtained from the model of production volume developed by handicraft enterprises in Kashkadarya region, it was predicted to increase by 1.03 times by 2021, and by 2.44 times by 2026.

IV. Conclusions

Thus, the processes of digital transformation in handicrafts have a high image, on the one hand, it leads to an increase in the quality of life of the population, an increase in their importance in the world economy, on the other hand, as a result of digitization of some sectors of the economy, an increase in the level of customer loyalty, a high level of satisfaction of their needs, saving time. provides an increase in the quality of life of the population.

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