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ANTONIO FOCACCI[1]

ECONOMETRICS AND BUSINESS: FINE-TUNING OF BREAK EVEN ANALYSIS

Abstract

Information is always a scarce resource. This is all the more true for firms operating in a very dynamic and turbulent macroeconomic environment such as the current one. The definition of the cost function then becomes an important element in the efficient management of the business. The classic and most popular method among academics and consultants to deal with this problem is based on the analysis of the income statement and the reclassification of costs according to their variability with respect to output. The break-even analysis is the main outcome of this approach. Such a methodology in its initial steps may encounter practical application problems. To deal with it in a useful way, we propose a simple regression technique able to reduce the considerable amount of time and resources required to deploy the traditional analysis.

Keywords: Cross-section Regression, Variable costs, Fixed costs, Econometric analysis

JEL Codes: C01, C15, L21, M21

Focacci, A. (2023). Econometrics and business: fine-tuning of break even analysis. In Conference Proceedings: Full Paper Series of MIRDEC 20th - Rome 2023 International Academic Conference on Economics, Business and Contemporary Discussions in Social Science, pp. (4-13). 22-23 May 2023. Rome, Italy. https://www.mirdec.com/rome2023proceedings.

1. Introduction

When it is necessary to analyze the business activity -also for the purpose of its management and planning- one of the most appreciated tools is the break-even analysis (also labelled as break-even point analysis, *BEP*). The preliminary and corollary of this choice is to be able to make a correct and consistent reclassification of business costs. Generally, this process starts with an analysis of the costs in the income statement through a breakdown between fixed and variable costs. The identification of the variability has as a benchmark the production. Output of a firm is defined, as usual, by its sales volume. Under an economic perspective, we can distinguish between the monetary terms (turnover in the specific currency) in which output is expressed and/or the physical units obtained (number of output, tons of sold commodities, etc). To get an economic equilibrium Total Costs (*TC*) must be equal to the Revenues (*R*, also called sales, or turnover, precisely).

As is well known, traditional cost analysis involves the use of accounting records (in this case the income statement) and a subsequent, painstaking identification for each individual item of its behavior with respect to production. This process is quite tedious and time-consuming to carry out as those who have tried this exercise know.

An additional overwhelming hurdle, especially for SMEs, can be found in the often lack of appropriate accounting documents given the non-mandatory nature from a legal standpoint.

The primary goal of this paper is to illustrate a different approach, based on a statistical/econometric technique, that can be usefully implemented with less effort and less accounting data without sacrificing its applicability to real cases. Very often econometrics is accused of being a set of techniques that are

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too theoretical and not suitable for practical applications. Let us try with this exercise to scratch this bad reputation.

2. The necessary analytical background

With the aim to depict the econometric approach, it is necessary to briefly refresh some theoretical aspects underpinning the issue.

As remarked in the Introduction, the economic equilibrium of the firm can be expressed as:

$$R = TC. \quad (1)$$

Additionally, *TC* (also labeled as expenses or losses) are the result of the sum of:

-variable costs (*VC*), whose path is directly associated with the volume of business activity (output);

-fixed costs *(FC*), whose overall amount does not change with the change of obtained output. These are costs that the enterprise has to sustain even in case of inactivity

As far as *FC* are concerned, their percentage incidence on total costs decreases as the production volume increases. This behavior is at the basis of the well-known concept of economies of scale (in fact, the higher the level of production, the greater the dilution of *FC* on the total output and the lower the percentage incidence on the product).

At this point, after appropriate substitutions in the (1), we will have:

$$TC = VC + FC \quad (2)$$

thus, combining the (1) and the (2), we have:

$$R = VC + FC \quad (3).$$

Being both *R* and *VC* related to the output expressed in physical terms *q* through the following:

$$R = p \times q \quad (4) \quad \text{and} \quad VC = vc \times q \quad (5),$$

wherein in the (5) the *vc* represents the variable cost per unit, the (3) can be rearranged on both sides as:

$$p \times q = vc \times q + FC \quad (6).$$

Solving the (6) for *q*, it is possible to find the classical break-even point (*BEP*) representing the quantity sold (in unit) necessary to get the economic equilibrium for the business:

$$q = FC / (p\text{-}vc) \quad (7).$$

In monetary terms, it sufficies multiply the quantity found by the price of the product.
Very often, the (7) is depicted in graphical form as hereunder re-proposed (Fig.1):

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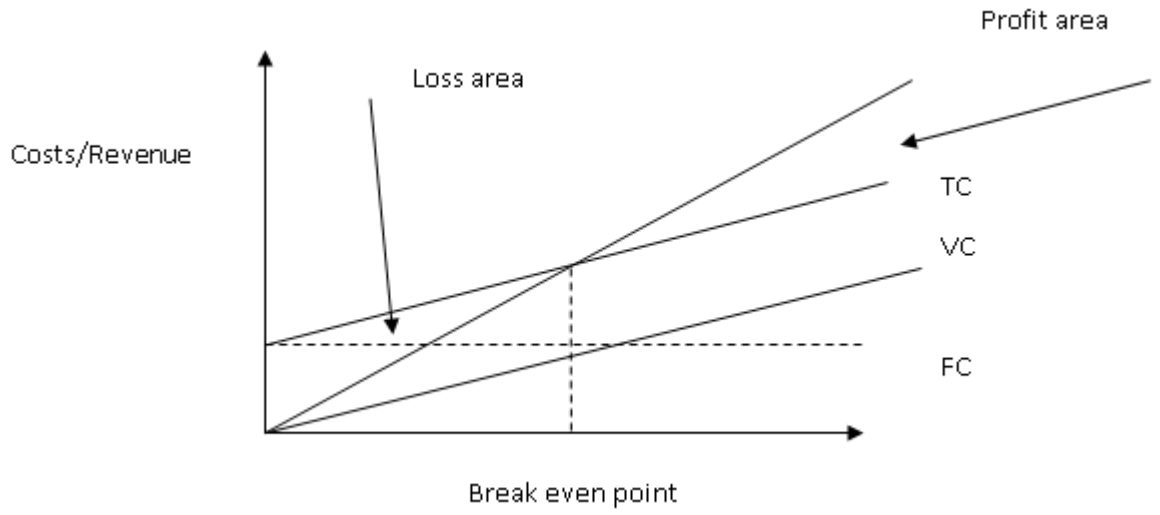
Figure 1. The Classical diagram to represent the Break-Even Analysis



Source: Author.

3. Issues and the possibilities to apply a different and more efficient methodology

The above depicted concepts are the foundations of the classical approach to address the economic problems within a firm. Additionally, such a combination of formulas constitutes the toolbox generally proposed in the analysis of real problems even by those in consulting work.

To step-up in the analysis process the milestone is the availability of accounting documents (income statement in this specific case). From the income statement, the consultant analyzes the costs behavior determining their variability item by item. This procedure can be usefully run for all those enterprises having a detailed and comprehensive information system. The other side of the coin lies in its tedious application, which can be prone to errors and interpretation (since it is often tied to the experience and sensitivity of the analyst pool). These are the typical issues affecting medium to large companies that are (partly for legal reasons) often obliged to have very large administrative structures.

The same considerations do not apply in the case of the Small and Medium-sized Enterprises (SMEs), whose weight is far from minor. The OECD reports that in the USA, the SMEs represent 98.4% of the market, while in the EU28 the percentage is 99.2% (OECD, 2015). In these cases some constraints act in limiting the activity of the entrepreneurs. First of all, the presence of an income statement fully available and detailed to deploy these elaborations. Secondly, time and costs are further limiting factors to gather information to proceed. The literature (see for example Kadadevaramath et al, 2015) highlights what common sense suggests.

However, overall resources' limitation does not seem to be a good enough mind reason not to implement better business management. Also because it is in the entrepreneur's own interest. The challenge is to find a smarter and more appropriate approach to tackle the issue.

Under a (strictly) academic perspective, the *BEP* methodology follows some assumptions well-described in management control literature (White et al., 2012 and Reichmann, 1997). The main critical issues at the methodological level include (Anthony et al., 2011; Drury, 2011 and Hansen et al., 2009):

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a) a linear relationship between revenues and expenses across the relevant range of volume (honestly speaking, some sophisticated versions of the model include also the hypothesis that costs maintain a constant value even with changing output through a step-function);
b) the appropriateness of the model for a single-product firm (in this cases, literature advices to adopt a *BEP* analysis with a weighting average computation of the whole product mix);
c) no unsold stocks.

We believe that a simple (but reasoned) use of econometric techniques can help both the entrepreneur and the consultant. Thus, the contribution underpins that an analytic approach trying to combine both scientific accuracy and "lacking" of traditional accounting data can overcome the issue and furnish a good solution. Our originality does not lie in the proposed techniques (well-known and widespread both in statistics and econometric fields, certainly also with valuable theoretical details), but in the specific application to the traditional managerial environment with the goal of expanding and simplifying the applicable/usable business data to pursue more accurate management decisions. This contribution originates from an article recently published by the author in which there are additional application details that are referred to from here on to avoid repetitions (Focacci, 2018).

4. The model to assess the cost function

As previously pointed out, the critical factor in this analysis is the correct classification of the costs. Taking this aspect on mind and considering the (6) representing *TC*, it is possible to adopt a linear regression model to derive the firm's costs function. The needed information are only two: the costs at the end of a selected period and the volume of output.

Regarding costs, this is the minimum information that an enterprise keeps in its books. To improve the quality and to get a complete analysis the amortization share or depreciation rate should be added. This is not a problem if you consider the monthly fraction for each specific depreciable asset.

For what concerns the output volume, the data can be retrievable considering the production schedule (for the manufacturing sector) or -alternatively- the amount of services provided in the same time period/frequency of the gathered total costs data. Thus, we can get this relevant information through an appropriate "output marker" able to indicate the volume of the business activity. The idea behind the model is quite similar to the preliminary selection of cost drivers, as is done when using activity-based cost analysis (ABC). Without saying that the appropriate output marker could be different among firms and among economic sectors depending on the needs and peculiarities. In the case presented here, the output marker for the volume of a manufacturer is expressed in physical terms as metric tons (mt).

Starting from these assumptions, the relationship involving costs can be synthesized as:

$$\text{Costs} = f\ (\text{output}) \qquad (8).$$

According to this, the further stage is to develop and define the appropriate function *f*. For such an issue the useful technique to try to adopt is a two-variable regression model, expressed as:

$$Y_t = \alpha + \beta X_t + \varepsilon \qquad (9).$$

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wherein:

-Y_t, is the series of *TC* recorded by the enterprise in the different months (t). It represents the dependent variable of the statistical model;

$-\alpha$, is the intercept of the cost function. From the firm's point of view, it represents the weight of the Fixed Costs in the function costs (i.e. these are costs that the firm must sustain independently by the level of output/activity);

$-\beta$ is the unit variable cost (*vc*) as proposed in the (6);

-X_t, represents the output marker strictly related to the *TC*.

$-\varepsilon$, is the error term (a random disturbance) supposed to be normally distributed, statistically independent, having constant variance and with zero expected value. Its inclusion is necessary to fit the model in most practical problems. Too many uncontrollable factors are present within real-world applications, and such factors render very difficult, if not impossible, to relate the dependent variable and the independent one without errors (Winston, 2014 and Harnett and Horrell, 1998).

5. The econometric definition of the cost function

In this Section a numerical case is proposed as an exercise to derive the cost function. Data are taken from the paper as already specified. In the following Table 1 the monthly figures for costs and output are gathered and resumed.

Running the Ordinary Least Squares regression model (OLS) for the data, we get the following results:

$$Y = 1.85 \times vc + 271.67 + \varepsilon \quad (10).$$

In Table 2 the summary of main resulting statistics are proposed. In the Fig.2 the scatter graph of the data with the regression (OLS) line.

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Table 1. Total Costs and Output data

Month	Costs (thousand €)	Output (mt)
January	601	175
February	501	132
March	381	58
April	371	51
May	501	118
June	566	158
July	653	210
August	667	227
September	677	233
October	725	253
November	787	256
December	753	246

Source: Author. Personal elaboration on data.

Table 2 – Statistics summary of first linear regression of the two-variable model

R^2	0.979	□	20.90	**Coef of var** 0.0349
Adj R^2	0.977	***F* stat**	467.03	**MAPE**
Df	11	□□ **residuals**	364.00	0.023
		t stat	**Lower 95%**	**Upper 95%**
Intercept	271.67	16.68	235.38	307.96
***vc* Coefficient**	1.85	21.61	1.66	2.04

Source: Author, Personal elaboration on data.

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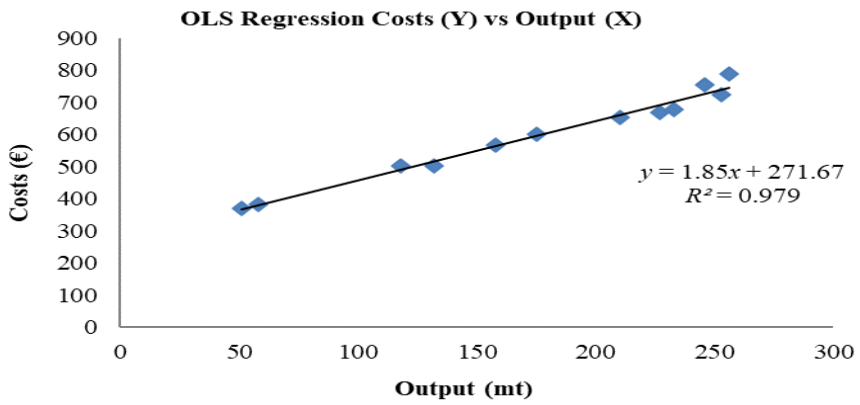
OLS Regression Costs (Y) vs Output (X)



Source: Author. Personal elaboration on data.

As we can see, the fit of the model is quite good (R^2 = 0.979) and to have a first impression the outcome is acceptable. This can be assumed as a raw estimation of the cost function of the firm. Probably, this calculation would be assumed as valid by most of business analysts. At this point, however, econometrics can help to "fine-tuning" the result.

To pursue this aim, we can say that this is simple two-variable regression model and not a model involving time series treatment, so the main concern to be investigated and (possibly) corrected is the potential presence of heteroschedasticity.

Heteroschedasticity in data is present when the error term has not constant variance. Under this condition, the OLS is not the best estimator, and there is another one with a smaller variance. Additionally, the standard errors computed are incorrect (Carter Hill et al., 2011). If this were the case, our model (10) should be correct. In order to investigate and detect this issue, we run two among the most popular and widespread tests: the Breusch and Pagan test (1979) and the White test (1980).

The outcomes of these tests resulting from the calculation are:

-Breusch-Pagan Lagrange Multiplier equal to 3.99 with p-value 0.05;

and

-White test TR^2 equal to 6.39 with p-value 0.04.

Since the null hypothesis is based on the existence of homoschedasticity, we cannot reject the presence of heteroschedasticity for the both tests (significance level 95%). Therefore, for the precautionary principle, we must assume a certain degree of heteroschedasticity in our first estimation (10).

In presence of heteroschedasticity, it would be adviseable to correct the model. To this aim as proposed in Pindyck and Rubinfeld (1988), we adopt a methodology appropriated for the case (error variances vary directly with the independent variable).

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The procedure consists of a transformation of the original linear model into a new one wherein each term is divided by the X_t.

Thus, starting from the (9), we will have:

$$Y_t / X_t = \alpha \times 1/X_t + \beta + \varepsilon^* \quad (11),$$

wherein ε^* = is the error term referred to the transformation.

Running the OLS regression with transformed data, the main resulting statistics can be seen in the following Table 3. Firstly, it is possible to mark, the sharp increase in the R^2 (from 0.979 to 0.996).

Table 3 – Statistics summary of the transformed linear regression model

R^2	0.996	**σ**	0.10	**Coef of var** 0.00015
Adj R^2	0.996	***F* stat**	2,628.48	**MAPE**
DF	11	**σ^2 residuals**	0.007	0.021
		t stat	**Lower 95%**	**Upper 95%**
Intercept	1.82	37.13	1.71	1.93
Coefficient of independent variable	276.70	51.27	264.68	288.73

Source: Author, Personal elaboration on data.

Checking for heteroschedasticity, we can find that:

-the Breusch-Pagan Lagrange Multiplier is equal to 1.26 with p-value 0.26;

and

-the White test TR^2 is equal to 2.33 with p-value 0.31.

As before, the interpretation of the results are that, since the null hypothesis is based on the existence of homoschedasticity, we can reject the presence of heteroschedasticity in either case (significance level 95%) and, therefore, we must assume homoschedasticity in the calculated regres¬sion model (11). As a result, the transformation proved to be efficient. Re-transforming the model to get the original formula, we will have:

$$TC = 1.82 \times vc + 276.70 + \varepsilon \quad (12).$$

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The (12) is the final outcome. Making a comparison with the theoretical model (6), we will have:

$$TC = vc \times q + FC$$

thus,

in our estimation *vc* will be equal to 1.82 and the *FC* will be 276.70 .

The estimations with and without the heteroschedasticity correction are quite similar at a very first sight. More in detail, for the *FC* (the * marks the corrected form): 276.70* vs 271.67 (+1.9%) and for the *vc* 1.82* vs 1.85 (-1.6%). Substantially, focusing on management aspects, the incidence of *FC* is higher and the opposite is true for variable items.

Considering the very turbulent environment in which enterprises must operate, we believe that recovering about a 2% of profitability simply through the correction is not a negligible result. Moreover, as previously stated, the time and efforts to gain these results are much lower than the adoption of traditional (and boring) costs classifications procedures.

6. Conclusions

The main aim of the present paper is to propose an application of econometrics technique to enhance and develop the management capabilities. The exercise is implemented for the *BEP* calculation through the estimation of firm's costs curve. In this case, we get the classic distinction between fixed and variable costs without the tedious and time-consuming ritual of one-to-one analysis of specific cost items, as required by accounting methods. On the contrary, the calculation procedure is quite lean and easy to implement. Only a couple of data are needed. They can be retrieved within the entrepreneur's information system. Regression results must be checked in order to detect the potential heteroschedasticity and, if it is the case, appropriately corrected.

As discussed, although the exercise may appear simplistic, the consequences and implications on a practical level are far from trivial. Without saying that, with proper adjustments, it can be deployed for all types of organization if whatsoever kind of *BEP* analysis is needed.

References

Anthony, R.N., Hawkins, D.F. and Merchant, K.A. 2011 *Accounting: Text and Cases, 13rd ed.* McGraw Hill Education, Boston USA.

Breusch, T.S. and Pagan, A.R. 1979. A simple test for heteroscedasticity and random coefficient variation. *Econometrica* 47 (5), 1287-1294.

Carter Hill, R., Griffiths, W.E. and Lim, G.C. 2011. *Principles of Econometrics, 4th ed.* Wiley, Hoboken, USA.

Drury, C. 2011. *Cost and Management Accounting: an introduction, 7th ed*. Cengage Learning EMEA, Andover UK.

Focacci, A. 2018. Costs function assessment: an empirical business analytics approach for decisional purposes, *International Journal of Business and Systems Research* 12 (1), 1-12.

www.mirdec.com CONFERENCE PROCEEDINGS: FULL PAPER SERIES ISBN: **978-605-74781-9-1**

Hansen, D.R., Mowen, M.M. and Guan, L. 2009. *Cost management: accounting and control, 6th ed*. South Western Cengage Learning, Mason USA.

Harnett, D.L. and Horrell, J.F. 1998. *Data, Statistics, and Decision Models with Excel*. John Wiley & Sons Inc, New York USA.

Kadadevaramath, R.S., Chen, J.C.H. and Sangli, M. 2015. Attitude of small and medium enterprises towards implementation and use of information technology in India – an empirical study. *International Journal of Business and Systems Research* Vol. 9 No. 2, pp. 123-137.

OECD (2015). OECD Factbook 2015: *Economic, environmental and social statistics*. OECD, Paris.

Pindyck, R.S. and Rubinfeld, D.L 1998. *Econometric Models and Economic Forecasts, 4th ed*., McGraw-Hill International Editions, Boston USA.

Reichmann, T., 1997. *Controlling: concepts of management control, controllership and ratio*. Springer, Berlin D.

White, H. 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica* 48 (4), 817-838.

White, J., Case, K.E. and Pratt, D.B. 2012. *Principles of Engineering Economic Analysis, 6th ed*. John Wiley & Sons. Inc, Hoboken USA.

Winston, W.L. 2014. *Marketing Analytics-Data-driven techniques with Microsoft Excel*. John Wiley & Sons. Inc., Indianapolis, USA.

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CARMEN LAZAR[1]

THE DIRECTIVES 71/96 EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL CONCERNING THE POSTING OF WORKERS IN THE FRAMEWORK OF THE PROVISION OF SERVICES AND THE DIRECTIVE (EU) 2018/957 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL AMENDING THE FIRST: WHAT IMPACT ON THE FREEDOM OF MOVEMENT?

Abstract

The freedom to provide services is one of the four freedoms of movement instituted by the Treaty establishing the Economic European Community. It requires the abolition of any obstacle on its way and forbids any discrimination based on nationality or residence from the part of the host State towards the providers from other Member States. Within this kind of movement, the providers may post workers in the host State, in order either to provide the services directly to the client, or to be hired-out temporarily by another employer (being included here the hypothesis of a temporary employment undertaking or placement agency which hires-out the workers to a user). In order to ensure a fair competition between the providers from poorer countries and those from richer countries of the Union (because in general the first are the sending States and the second the host States) and also to protect the rights of the workers, the Union legislator has thought to extend the labour legislation (including collective agreements or arbitration awards in some conditions) of the host States to the workers posted on their territories, unless the legislation of the other State is more favourable to the employees. One of the main differences between the two directives is that concerning the pay of the workers: the first directive speaks about the minimum pay, while the other about the remuneration, which may constitute a negative change for the providers of services. Another difference is the application of the collective agreements not only to the sector of the constructions, but to all the sectors of the economy. We can wonder if the freedom of services will not be de facto affected by these directives.

Keywords: Directive, freedom to provide services, posting of workers, collective agreements, arbitration awards, remuneration

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1. Introduction

The freedom to provide services is one of the four freedoms of the founding treaty of the European Economic Community and one of the most efficient means of integration of the economies of the Member States. It is governed at the present time by art. 56-62 of the Treaty on the Functioning of the European Union. One of the modalities through which the economic operators provide services in other Member States than theirs is to send workers to perform effectively the respective service, that is, to post them. Is is understandable that the undertakings, when they provide transnational services, prefer to post their workers in the State of the recipient of the services instead to have recourse to the local workers (Van Nuffel & Afanasjeva, 2018: 1402).

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The problem is that, although the posted workers do not integrate in the labour market of the host State, they compete with the workers who work permanently there. And, with the enlargement of the European Union and the accession of States from Central and Eastern Europe, whose economic level is lower than that of the Western States, the public opinion and the economic operators established in the host States have considered that the workers posted there by the providers of services compete unfairly with the "local" workers, because they are paid in accordance with the standards of their countries of origin, and the providers of services compete unfairly with the "local" economic operators, because they have lower costs with their employees. This unfair competition pushes towards the social dumping or the "race to the bottom", that is the lowering of the wages and other social advantages, in the host State, since the States have different social and labour conditions (S. Reçi, 2016: 44; Kochanowski, 2018: 251; de Carvalho, 2018: 721; Neagu, 2015: 745). At the same time, the jurisprudence of the Court of Justice concerning the freedom of movement has aroused much controversy in the host States, because it prevented the States to hinder too much this freedom by imposing to the foreign providers all or the most part of their laws in social and labour matters (Reçi, 2016: 47-48; Van Nuffel & Afanasjeva, 2018: 1409)[2]. It is to be mentioned in this respect that the second directive inserts after the title a provision which specifies that it does not affect the freedom to strike, the freedom to take other action against the employers and the right to negotiate, to conclude and enforce collective agreements, in accordance with national law and/or practice, that is, just the rights which were in question in the cases before the Court of Justice.

The public opinion of the developed countries is understandable too (Van Nuffel & Afanasjeva, 2018: 1402), but the percentage of the posted workers does not justify it: this percentage represents only 2% from the total dependent work at the Union level (Cremers & Donders, 2004: 11); on the other hand, curiously, the States which were and are at the top of the sending States are France, Germany and Poland, so one single East European State and two the most developed States of the Union (Kochanowski, 2018: 261)!

This is why it is contradicted by those - most of them of the Eastern European countries – who sustain that the directives have been adopted for the Member States to protect their labour markets from the foreign competition (Reçi, 2016: 44-45; Kochanowski, 2018: 262).

As a consequence of what was said above, the Council and the Parliament have adopted the Directive 96/71[3] (which we call henceforth the first directive) and, amending it, the Directive 2018/957[4] (which we call henceforth the second directive).

It is remarkable that even before the first directive has been adopted or before the delay of transposition has been expired (by 16.12.1999), there were national legislations with essentially the same content (Cremers & Donders, 2004: 4) and the Court of Justice has recognized the right of the States to apply to the posted workers their labour laws, if it is about public policy provisions, necessary for the safeguarding of the economic, politic or social order of the State, on the condition that these provisions apply proportionately and without discrimination to all the undertakings[5].

[2] See also the Dec. ECJ "Laval" 341/05 of 18.12.2007 (site europa.eu). Dec. "International Transport Workers' Federation e.a. - called Viking" - 438/05 of 11.12.2007 (site europa.eu).
[3] Published in the Official Journal of the European Union L18 of 21 January 1997.
[4] Published in the Official Journal of the European Union L 173 of 9 July 2018.
[5] Dec. ECJ "Seco e.a." 62 and 63/81 of 3.02.1982 (site europa.eu). Dec. ECJ "Rush Portuguesa Ldª" 113/89 of 27.03.1990 (site europa.eu). Dec. ECJ "Arblade e.a." 369 and 376/96 of 23.11.1999 (site europa.eu). Dec. ECJ "Portugaia Construções Ldª" 164/99 of 24.01.2002 (site europa.eu).

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The phenomenon of the posting is a cross-border one, at the limit between the internal market and the protection of the workers (Van Nuffel & Afanasjeva, 2018: 1403), which has raised the problem of the legal basis for the adoption of the two directives (see below).

2. The content of the two directives. Comparison between them

We do not have the intention to analyse the entire content of the two directives, other authors have done it before us, but only to underline some critical aspects or some lacks of them, of the jurisprudence or of the scholar literature on them.

What is curious is the fact that the first directive claims to have been adopted in the first place in order to secure and promote the freedom to provide services, while it affects this freedom by establishing a balance between it and the protection of the workers and of the fair competition on the market. Of course, no freedom or right is absolute and it might be necessary, thus legitimate, to limit a right in order to protect another right. But then the Community legislator should have choosen as legal basis for the directive the social provisions of the treaty, not the article 57 and 66 on the freedom of movement. The second directive has used the same legal basis, because it amends the first, and has been challenged for this reason - among others - by two Member States[6], but the Court upheld the choice of the legislator.
Curiously again, some authors (Cremers & Donders, 2004: 8) affirm in the same line as the directives that the freedom of movement would be affected if the workers lost their social protection by the posting in another State; or, in the absence of the directives, they would be paid with the salary from their countries of origin, so they would not lose anything irrespective of the fact that they move from a poorer State to a richer State or inversely.

An unexplainable provision is that contained in the paragraph with the definition of the posting: the directives shall apply only if there is an employment relationship between the undertaking which posts and the worker posted. But this belongs to the nature of the posting! There can not be posting without an employment relationship, so the provision is superfluous.

In the meaning of the two directives the term "posting" refers to more situations than those regulated by the national laws: the sending of a worker to a client (the recipient of services), the sending of a worker to an establishment or an undertaking of the same group and the sending of a worker by a temporary work undertaking or a placement agency to a user. The last hypothesis is not considered by the national laws as posting, having a special regime, and even at the European level there is a directive specially adopted for it[7]. Moreover, the Romanian law, for example, considers as posting only the sending of a worker to perform a work for another employer, the contract with the habitual employer being suspended; the sending to a client is called "delegation".

The provisions of the first directive concerning the hypothesis of posting have a lack: they do not cover also the situation in which the worker is neither to a client, nor to another employer from the same group posted, but to another employer who does not belong to the group! This lack is unexplainable and has not been corrected by the second directive.

[6] Dec. ECJ "Hungary/Council and Parliament" 620/18 and "Poland/Council and Parliament" 626/18 of 8.12.2020 (site europa.eu). The Court found out that the main objective of the directive is to facilitate the freedom to provide services through the coordination of the national labour legislations, the divergencies between these last being an obstacle to the freedom mentioned. The problem with this argumentation is that the directives do not effectuate a coordination between the national legislations, but only impose the national legislation of the host State to the posted workers from another State!

[7] Directive 2008/104/EC of the European Parliament and of the Council on temporary agency work, published in the Official Journal of the European Union L 327 of 5.12.2008.

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Concerning the third hypothesis of posting, we must make more remarks. First, the second directive adds a paragraph which specifies that, if a temporary worker is posted by the user in a third Member State, the posting will be considered as being made by the temporary employment undertaking, not by the user, and this last must inform the first about the posting. This is normal, given that it is the temporary employment undertaking that pays the worker and, so, it is it which must respect the provisions of the directive concerning the salary. We only wonder how, under the first directive, this situation would have been interpreted, so what law would have been applicable to the worker (Van Nuffel & Afanasjeva, 2018: 1424-1425), taking into account that this hypothesis did not find in the first directive as a posting; the correct answer, in our opinion, is that the worker would have been paid with the salary from the State of the user or that from the State of the temporary employment undertaking, depending on which is the richer State. Second, this new paragraph added by the second directive contains a non-sense, by refering to the posting by the user through the three forms mentioned above; or, the third form – the temporary work – may not be legally used by a user of a temporary work, that is a user may not "pass" the worker to another user! Third, the second directive claims to amend the first by replacing the point concerning the temporary work with another, but if we look carefully we do not see any difference between the older and the newer version; they are identical! Fourth, the second directive solves a problem raised by the first and highlighted by some authors (Cremers & Donders, 2004: 25-26): what collective agreement would apply to the temporary workers, that which regulates the temporary work in general or that which regulates the sector of activity in which the worker performs his work? While under the first directive the States might submit the temporary workers posted on their territory to the temporary work regime provided for by their laws, the new directive provides that they must submit those workers to the specific regime provided for in the specific directive mentioned above; the States may also add other rights and terms of employment that apply to the temporary workers by virtue of their laws.

With regard to the notion of "posting", taking into account the absence in the first directive of provisions which say what is the maximum period of the posting, the number of postings in the same place and the proportion between the time spent in the sending State and that spent in the host State (Neagu, 2015: 745), it is to the Court that incumbed the role to clarify some of these aspects and for the others we have to refer to the national law (indeed, the national legislations normally provide the duration of a "national" posting[8]). The Court stated that a posting requires a sufficient relationship of the worker with the host State, taking into account the time spent, the amount of work performed etc. In this sense, the transit of a driver on the territory of one or more States does not constitute posting, nor a short transport does, even if in this last case the travel finishes in the host State[9]; nor the provision of services of cleaning, food and beverages to the passengers of an international train which transits a Member State, if the employee begins and finishes his work in the State from where the train leaves, constitutes posting[10]. Nor a fixed-term contract represents a posting (Kochanowski, 2018: 253).

Concerning the term "worker", although one should expect that for it the directives make reference to the legislation of the sending State, they refer to the legislation of the host State for their purposes. This is not normal, in our opinion, because the employment relationship is established in the sending State and is carried out habitually there. The more so as the conclusion of an employment contract and the termination of such a contract fall under the national law of another State than the host State. In the same sense, other authors (Van Nuffel & Afanasjeva, 2018: 1407) sustain that if a person is not protected in

[8] However, there are authors (Cremers & Donders, 2004: 21-22) who affirm that are national legislations which do not have provisions on this point, for example the Dutch legislation, because they transposed *tale quale* the directive, which can raise a problem. But, in our opinion, it is not necessary for a State to have separate provisions on the transnational posting, it is sufficient for it to have provisions on the posting in general. We doubt that the Dutch legislation does not have such provisions.
[9] Dec. ECJ "Federatie Nederlandse Vakbeweging" 815/18 of 1.12.2020 (site europa.eu).
[10] Dec. ECJ "Dobersberger" 16/18 of 19.12.2019 (site europa.eu).

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her country as a worker, it would not make sense that she be protected as a worker in the host country; this would be not anymore equality, this would be a favor! There are also authors who consider that the leaving of the definition of the worker to the national legislations can have disadvantageous consequences for the workers (Reçi, 2016: 46).

The directives do not define the term of undertaking, which can raise some problems. First, we consider that they apply both for the public and the private undertakings. Secondly, one may wonder if by undertaking it must be understood only the economic operators - so, undertakings *stricto sensu* - or also the legal persons which perform a non-economic activity - undertakings *lato sensu*. If we refer to the purpose of the directives, we must find out that the employees of the legal persons which provide services without financial counterpart need the same protection as the employees of the companies and other economic operators, so the directives must apply to them too. However, the public non-economic legal persons must be excluded in the States (like Romania, for example) in which their personnel have in general a special regime and is paid according to special laws, from which it is not possible to derogate by collective agreements. In this case it would not be admissible that a worker sent by such a legal person in another State be paid according to the law of the host State. So, by undertakings we should understand the private ones, irrespective of their activity, and the public economic ones. Certainly, it will be the Court of Justice, which did not have the occasion to do it, to which will incumb the role to state on this point.

Although the directives have been adopted in order to ensure to the workers posted from a poorer State in a richer State the social rights of the latter, as we have seen at the beginning and as it is reflected in their preamble, their provisions do not make a difference, being applicable irrespective of which State is the sending State and which one the host State[11], which would contradict their intentions and purpose if there was not another provision which says that more favourable terms and conditions of employment may apply to the posted workers[12]. So, it is to be expected that in a poorer host State a worker from a richer State will not "benefit" from worse conditions than in the sending State. It is true that, in practice, it might be difficult to establish what is the more favourable legislation for the posted worker, because this supposes a comparison which is not always easy to make; would be preferable a global comparison between salarial and social "packages" or a comparison between elements of the same nature? (Cremers & Donders, 2004: 22-23 and 40-41)[13]. Some authors (Van Nuffel & Afanasjeva, 2018: 1418) consider that, when it is about the salary, it is the gross salary which will be take into account, not each element of it.

In order to diminish the risks of social dumping, about which we have spoken above, both directives establish what others called a "hard core", a minimum nucleus of rights (larger in the second directive than in the first) of the posted workers which must be respected by the employers, as provided for by the law (in the larger sense[14]) and/or the practice[15] of the host State. The right which caused the most the

[11] Contrary to the affirmation of an author, who says that the directive is unilateral (De Carvalho, 2018: 722).
[12] Interpretation reflected in the Dec. ECJ "Laval" 341/05 cit.
[13] An older decision of the Court would be in this respect a landmark, establishing a global comparison, taking into account not only the salary, but also the fiscality and the contributions to the social funds (see Dec. ECJ "Mazzoleni" 165/98 of 15.03.2001, site europa.eu).
[14] The law comprises not only the law of the State, but also the collective agreements which meet some conditions (see in the text). On the other hand, the law of the State is not only the national one, but also the local ones (where they exist), not only the law which apply in all the cases to all the workers of a sector, but also those which apply only in some cases (for example the public procurement) (Dec. ECJ "RegioPost" 115/14 of 17.11.2015, site europa.eu; Van Nuffel & Afanasjeva, 2018: 1415).
[15] This notion is vague and non-defined, as others have remarked (Tomaszewska & Szypniewski, 2016: 383), so it can lead to abuses. It is inadmissible that a normative act refers to the practice! The practice may not be confused with the customs, which, indeed, may be sources of law.

adoption of the directives is, of course, the salary, which, in accordance with the first directive, had to be paid at the minimum level[16] prescribed for by the law or, for the construction sector, by the collective agreements of the host State; derogations are permitted related to the lenght of the posting[17], of the amount of work performed, of the activity performed etc. The minimum salary was that defined by the legislation of the host State, not by that of the sending State, but it has been firmly established in the scholar literature and in the jurisprudence of the Court of Justice that irrespective of this definition in its content may not enter increases for overtime work, premiums and other pluses which are rewards for some persons or circumstances and modify the relationship between the work and its payment (that is, they are not paid for overtime work), but do enter the normal, objective increases (for the length of the service, for a diploma in plus etc.), the salary for the 13th and 14th month etc.[18]. Also, do enter the leave allowance and the allowance for the daily movement of the worker to and from the workplace, if this last takes more than 1 hour and is not destined to cover the expenses with the movement[19]. So, the minimum salary did not comprise the reimbursement of the expenses made effectively by the workers with the travel abroad (transport, boarding, lodge), but it comprised the posting allowance[20], which is destined to compensate the fact that the worker carries out his work out his habitual place and country. Of course, it is the legislation of the host State which establishes the modalities in which the salary is established, that is, the payment per hour or per month or depending of the length of service, the qualification etc. (Tomaszewska & Szypniewski, 2016: 387)[21]. Taking into account the prescriptions of the first directive, the States might not impose, directly or indirectly (through the legislation on the public procurement[22]), a salary which is higher than the minimum one established by the law or by the collective agreements referred to in the directive[23]. In this respect, the directive was considered a maximum standard (Neagu, 2015: p.746; Van Nuffel & Afanasjeva, 2018: 1409; Voiculescu, 2017: 4-5; Van der Flies, 2018: 6). The last two authors criticize the jurisprudence of the Court of Justice, but in the light of the first directive this jurisprudence was correct. Moreover, an inverse interpretation would create juridical insecurity, which would go against the objectives of the directive (Van Nuffel & Afanasjeva, 2018: 1409). This strict interpretation of the Directive 96/71 is also that of the Council and of the Commission (Cremers, 2008: 11 and 12). Also in this respect, the provision of the directive according to which it does not prevent the application of more favourable conditions to the workers may not be interpreted by the States in the sense mentioned above, but, on one hand, in the sense that the employer may, if he wants, apply more favourable conditions to his posted workers either by adhering voluntarily to a collective agreement which does not meet the criteria of the directive or by the individual labour contract (Van Nuffel & Afanasjeva, 2018: 1409 and 1412)[24], and, on the other hand, in the sense that the legislation of the sending State will apply if it is more favourable, as we have said before. The

[16] The directive (in its English and other linguistic variants) uses the term "minimum rates of pay", while other variants that of "minimum salary". Some wonder if these two terms are identical (Tomaszewska & Szypniewski, 2016: 382). The States consider so and in our opinion this is correct.

[17] In order to calculate the lenght of a posting for the purpose mentioned above, all the postings made for the same place and the same work shall be taken into account, irrespective of the fact that there were one or more workers posted.

[18] Dec. ECJ "Isbir" 522/12 of 7.11.2013 (site europa.eu). Dec. ECJ "Commission/Germany" 341/02 of 14.04.2005 (site europa.eu).

[19] Dec. ECJ "Sähköalojenammattiliitto ry" 396/13 of 12.02.2015 (site europa.eu). Through this decision the Court has changed its jurisprudence concerning the mentioned allowances (Contreras Hernandez, 2019: 131).

[20] Dec. ECJ "Rapidsped" 428/19 of 8.07.2021 (site europa.eu). Dec. ECJ "Sähköalojenammattiliitto ry" 396/13 cit.

[21] Dec. ECJ "Sähköalojenammattiliitto ry" 396/13 cit.

[22] For example, the States often asked to the contracting authorities not to adjudicate a public contract to an undertaking which does not engage itself to pay a higher salary, provided for in a collective agreement which does not meet the criteria of the directive.

[23] Dec. ECJ "Rüffert" 346/06 of 3.04.2008 (site europa.eu). Dec. ECJ "Commission/Luxemburg" 319/06 of 19.06.2008 (site europa.eu). Dec. ECJ "Laval" 341/05 cit. Dec. ECJ 438/05 "Viking" cit.

[24] Dec. ECJ "Laval" 341/05 cit.

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second directive, instituting the principle "equal pay for equal work at the same place", which is of a nature to ensure a correct competition (De Carvalho, 2018: 729) and is imposed by the principle of the just distribution, of the equality of opportunity (Dumancic & Preloznjak, 2018: 115 and 117)[25], required imperatively by the richest States, replaces the minimum salary with the remuneration, which entails the consequence that the posted workers must be paid the same salary as the local workers who perform their activity in the same place and in the same sector[26], salary whose content is defined, of course, by the legislation of the host State. That is, the salary may comprise, if the legislation so provides for, all the pluses mentioned above. The second directive keeps the derogations mentioned above.

The second directive adds to the hard core of rights another two: the reimbursement of the expenses with travel, board and lodging within the host State, so from the regular place of work to another and inversely; the conditions of accomodation, where this last is provided by the employer to workers away from their regular place of work within the host State.

Concerning the collective agreements, the reference to them was and is explainable and necessary by the fact that in some countries the minimum salary (and other conditions, too) is not provided for by the law of the State, but by collective agreements. Also, in some States there is a system for declaring a collective agreement of universal application, by virtue of the law, so generally, or of an executive individual act, so on a case-by-case basis, in others there is not. In Romania, for example, only the collective agreements concluded by representative employers' and labour organizations (the representativity being defined by the law), at any level, acquire by virtue of the law the character of universal application, so they have the legal force of the law on the condition that they are not less favourable to the workers than the law, but this universality is restricted to the workers: that is, a collective agreement will not apply to the employers who have not signed it, directly or through their organizations. The first directive speaks about the collective agreements of universal application and provides that, in the absence of the system mentioned above, the States may rely on collective agreements or arbitration awards which are generally applicable to all similar undertakings in the geographical area and in the profession or industry concerned (that is, agreements which are *de facto* universally applicable) and/or collective agreements which have been concluded by the most representative employers' and labour organizations at national level and which are applied throughout national territory[27]. The second directive permits to the States to rely on the two last categories of collective agreements even if they have a system of declaring universally applicable a collective agreement, but this novelty is not in fact so important: since the host State may declare of universal application a collective agreement, it has just to do it! It is considered in the scholar literature (Contreras Hernandez, 2019: 135; Sala Franco & Lalaguna Holzwarth, 2019: 47) that this provision is an answer to the jurisprudence of the Court of Justice[28]. While the first directive refered to the collective agreements only for the constructions sector (where the posting was and is the most frequent), the second directive expands the reference to them for all the sectors of activity, reinforcing thus their role (De Carvalho, 2018: 726) and instituting *in fine* the equality of treatment between the workers from the constructions sector and the others (Contreras Hernandez, 2019: 132). A problem is the fact that the directives do not refer also to the collective agreements at the level of the undertaking to which a worker is posted (Van der Flies, 2018: 8)[29]; in the absence of the collective agreements from the categories mentioned above, it would have been preferable for a worker to be paid by reference to the agreement

[25] The Rawls's principle.
[26] The Court has stated that the requirement of the equal remuneration is normal, because the remuneration has to cover the cost of the life of the worker in the host State, so it must be that provided for in this State (see Dec. ECJ "Hungary/Council and Parliament" 620/18 and "Poland/Council and Parliament" 626/18 cit.)
[27] This is why we are astonished by the fact that an author (Contreras Hernandez, 2019: 136) wonders himself what happens if in a State there are not collective agreements of legal general application!
[28] Dec. ECJ "Rüffert" 346/06 cit.
[29] Supposing that they exist.

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existent at the level of the undertaking, rather than by reference to the law of the (host) State, which would be then applicable (Van der Flies, 2018: 9), because the collective agreements are more favourable than the law. And what if the law itself does not provide anything about the minimum salary? Of course, one may object that is a very improbable hypothesis, but the fact is that the legislator must think about all the hypotheses which can appear and this hypothesis is not covered by the directives. In this case the employer will pay the salary provided for by the applicable collective agreements or the law of the sending State and, in the absence of all these, the salary agreed by the labour contract. This is why it is the obligation of the national legislators (especially those from the rich States, because it is their interest) to provide for the minimum salary in their laws, irrespective of the fact that there are or not collective agreements at a given moment, if they want to give full effectivity to the directives. Another problem which can appear is related to the undertakings with more than one activity: what collective agreement, that is, from what sector of activity, would apply to them? In some States more criteria are used: the main activity of the undertaking, the main activity of the worker himself, the activity of the department to which the worker belongs etc. (Cremers & Donders, 2004: 44-46). Taking this into account, we are of the opinion that the criteria of the host State will apply also to the posted workers.

The second directive introduces also a very interesting provision, namely that which imposes the application to the posted workers of all the rules of the labour law of the host State if the posting exceeds 12 months (or, by derogation in cases duly motivated by the employer, 18 months)[30]; in order to prevent the circumvention of this provision by undertakings which would post more employees in the same place, for the same work, no more than 12 months each employee, it is provided that the duration of the posting shall be the cumulative duration of the posting periods of the individual posted workers concerned. The affirmation of an author according to which the second directive limits the duration of the posting is, thus, erroneous (Contreras Hernandez, 2019: 134), even if some social actors, who inspired the second directive, have wanted this (Van Nuffel & Afanasjeva, 2018: 1421). The preamble of the directive expressely states that the States may not forbid a longer posting.

It is important also to mention that, beside the hard core of rights expressely imposed by the directives, the States have the right to impose their mandatory rules of public order (public policy provisions)[31] adopted in the field of the labour relations to the foreign undertakings, because those rules must be respected also by the national undertakings, in order to give full effect to the principle of equality. However, the public policy character of a rule is not established by the States, as we could think, but by the Court of Justice, in order to prevent the abuses, as in many other matters[32]. In the case of the posting, an unjustified extension of the mandatory rules of the host States to the foreign undertakings which only

[30] Even if the directive provides itself for the most part of these conditions.

[31] It is to be mentioned that these rules are only those comprised in the laws of the State, the collective agreements which are not of legal general application being excluded (see in the same sense Dec. ECJ "Laval" 341/05 cit.). In exchange, contrary of the opinion of an author (Cremers, 2008: 13), the international conventions, like those concluded under the International Labour Organization, belong to this category, because they are acts of positive law. The author cited above confuses (Cremers, 2008: 14 and 16) the right to collective negotiations - which is, indeed, a constitutional right - with the legal force of the collective agreements – which are, if they are of legal general application, rules with infraconstitutional legal force.

[32] As we have shown, the national measures must respect the principles of equality and proportionality. Some (Cremers, 2008: 14 and 15) criticize this jurisprudence, considering that it is based on a declaration of the sole Council annexed to the Directive 96/71 and non-published until 2003, and affects the competence of the States to define their mandatory rules. Moreover, this interpretation departs itself from the European social model and from the balance between diverse national legislations. But the orientation of the Court was always in this sense concerning the national legislations, so we do not believe that it based its solution on the mentioned declaration, the more so as it always considered the declarations annexed to the legal norms as being without legal force.

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provide services would equate the provision of services to the establishment, which is not admissible; moreover, concerning the first directive, this would have deprived it from its useful effects[33].

3. Conclusions

The second directive has been adopted because the first was inefficient and this last was considered inefficient because many employers did not respect the legislation of the host States or they comitted frauds by establishing their seat in a Member State - with higher salaries and social costs - and carrying out almost their activity, by providing services, in another - with lower salaries and social costs; the administrative cooperation between the States, for the monitoring of this respect, was weak (Kochanowski, 2018: 255 and 258), despite the fact that another directive[34] have been adopted for the enforcement of the Directive 96/67. The adoption of the second directive would have been justified because of the insufficient content of the first, but not because the first is not respected in practice! And who guarantees that the second will be respected? Nothing prevented the States to cooperate in order to ensure the respect of the first directive, as proves the adoption of the Directive 2014/67 mentioned above. And the explanation with the fraud is not logical, because according to the directive the legislation of the sending State will apply if it is more favourable than that of the host State; unless if the undertakings disguised the provision of services under an establishment.

The opinions on the two directives are divided. Among the negative opinions we can cite: the first directive has led to social dumping and to relocations of undertakings (Tomaszewska & Szypniewski, 2016: 381-382; Sala Franco & Lalaguna Holzwarth, 2019: 40); the economic reason - the freedom to provide services and the competitivity - has prevailed over the social ones (Dumancic & Preloznjak, 2018: 118); the freedom to provide services was not transparent within the first directive, because it was the employer who decided if and where he posts workers, while the second directive brings more transparency on this point (Dumancic & Preloznjak, 2018: 118); the first directive did not contribute to the achievement of the equality between the foreign undertakings and the local ones, the first being obliged to respect only a minimum core and the imperative legal norms which are of public order, while the others had to respect all the imperative norms of the host State (Cremers, 2008: 12); the fact that there was and is no harmonization at European level concerning the components of the minimum salary has led to inequities and problems in practice and creates legal insecurity for the employers (Contreras Hernandez, 2019: 132; Van der Flies, 2018: 6); the second directive will have a damaging effect on the freedom to provide services and on the bussiness in general, will encourage the economic protectionism and reinforce the distortions of competition which it tried to avoid, will lead to new questions addressed to the Court of Justice by the national courts (Tomaszewska & Szypniewski, 2016: 382; De Carvalho, 2018: 731-732; Contreras Hernandez, 2019: 133-136); the second directive goes against the jurisprudence of the Court of Justice, which was more balanced in tempting to concile the freedom to provide services and the protection of the workers and of a correct competition (De Carvalho, 2018: 732); it is possible also that the undertakings post workers who are *de jure* independent but *de facto* dependent, in order to avoid the application of the equal treatment rule concerning the salaries (Van der Flies, 2018: 11); the obligation of the undertakings to pay taxes and social contributions for the workers in the host States affects the competitivity and is injust (Tomaszewska & Szypniewski, 2016: 383-384)[35]; despite the fact that they bring ameliorations to the situation of the posted workers, both directives follow a continuous line, that of the promotion of the freedom of movement (Sala Franco & Lalaguna Holzwarth, 2019: 51); the second directive will have a limited practical efficiency (Contreras Hernandez, 2019: 136).

[33] Dec. ECJ "Laval" 341/05 cit.
[34] Directive 2014/67, published in the Official Journal L 159 of 28.05.2014.
[35] We suppose that the author refers to the situation in which the posting lasts more than 2 years.

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To some of these points of view we can object that: one can affirm that the first directive has not eliminated the social dumping, because it provided only for the minimum salary, but not that it has led to this; it is normal that the employer decides when, where and if he posts a worker – this belongs to the right to conduct his own bussiness – and the second directive did not change anything about this; the States are obliged to make transparent and accessible their legislation on the salaries and the other aspects, so the employers will know what are their obligations in this respect, even it is true that, by the fact that the salaries and also the mandatory labour and social rules differ from a State to another, the employers will not be in the same position at the Union level; the directives do not provide anything regarding the fiscality (Van der Flies, 2018: 5 și 11), so the taxes and social contributions must be paid only in the sending State; the opinion according to which the second directive will have a limited practical efficiency is not justified with any argument.

There are also positive opinions: the second directive does not institute new barriers on the way of the freedom to provide services and does not affect the competition, it only eliminates the possibility to speculate the differences in salaries as an element of the competition; or, this speculation leads to the accentuation of the differences between States, having thus a negative effect on the standard of leaving of the people, and is not a long-term solution for the creation or the maintenance of jobs (Voiculescu, 2017: 7-9)[36]; according to the Treaty of Lisbon (as the anterior treaties, we would add) the economy of the Union is a social market economy, the consequence being that all the normative acts must take into account the social aspect of any objective; or, the Directive 957/2018 just does it and contributes to adapt the European labour market (Tomaszewska & Szypniewski, 2016: 379); the second directive is not anymore perceived as an instrument of economic protectionism, but as one of safeguarding of the social legitimacy of the internal market, in line with the Charter of Fundamental Rights, which imposed changes in the interpretation of the freedoms of the Union treaties (Van Nuffel & Afanasjeva, 2018: 1427); by it the European labour market will become more close to justice and equality than to liberalization and competitivity (Dumancic & Preloznjak, 2018: 120).

A satisfactory solution would be the adoption of a European minimum salary (Tomaszewska & Szypniewski, 2016: 389), but these authors recognize that it is neither legally – the Union is not competent for this – nor economically feasible.

References

Contreras Hernandez, O. (2019). Business networks and labour conditions of posted workers after adoption of the Directive (EU) 2018/957 amending Directive 96/71/EC. *Valahia University Law Study: supplement*, 128-136

Cremers, J., & Donders, P. (2004). *The free movement of workers in the European union: directive 96/71/EC on the posting of workers within the framework of the provision of services: its implementation, practical application and operation*. Reed Business Information.

Cremers, J. (2008). Conflicting interpretations of the posting of workers directive. *CLR news*, *2008*(3), 10-16.

De Carvalho, S. (2018). The revision of the Posting of Workers Directive and the freedom to provide services in EU: towards a dead end?. *Tribuna Juridică*, *8*(17), 719-733.

De Carvalho, S. (2019). The significance of directive (eu) 2018/957 in the engineering contract.

[36] This author considers that Romania must concentrate on its internal development, in order to attain the economic convergence and the convergence of the standards of living with the richer States.

Dumancic, K., & Preloznjak, B. (2018). Revision of the posted workers Directive - is there equality of opportunity for posted workers?. *Economic and Social Development: Book of Proceedings*, 115-121.

Kochanowski, M. (2018). Rights of the Posted Workers–Directive 96/71/EC and the Evolution of Legislation Concerning Posted Workers. *Przegląd Prawniczy Uniwersytetu im. Adama Mickiewicza*, (8), 251-263.

Neagu, V. (2015). Posting of workers in the European Union: Between limiting policies and stimulating standards. *Conferința Internațională de Drept, Studii Europene și Relații Internaționale*, *3*(III), 744-750.

Reçi, S. (2016). Posted Workers Directive 96/71/EC in the Framework of Free Movement of Services. *Mediterranean Journal of Social Sciences*, *7*(3), 44.

Sala Franco, T. y Lalaguna Holzwarth, E. (2019). Evolución y aspectos críticos del desplazamiento transnacional de trabajadores en el ámbito de la Unión Europea. *Revista de Trabajo y Seguridad Social. CEF*, *439*, 21-53.

Tomaszewska, M., & Szypniewski, M. (2016). Are the Minimum Rates of Pay of Posted Workers in Compliance with the Social Market Economy?. *Studia Iuridica*, *68*, 379-391.

Van der Vlies, R. (2018). The Revision of the Posted Workers Directive: towards a full level playing field.

Van Nuffel, P., & Afanasjeva, S. (2019). The posting of workers directive revised: enhancing the protection of workers in the cross-border provision of services. *European Papers-A Journal on Law and Integration*, *2018*(3), 1401-1427.

Voiculescu, N. (2017). Posting of Workers in the European Union: Affects and Effects at Political and Legal Level. *Analele Universității Titu Maiorescu*, (XVI), 17-30.

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TAMER BUDAK[1]

RECENT DEVELOPMENTS OF TAXATION OF CRYPTO ASSETS

Abstract

Crypto asset is a cryptographically secured digital representation of value or contractual rights that uses a form of distributed ledger technology and can be transferred, stored, or traded electronically. Crypto assets can be divided into three simplified categories such as exchange crypto, security crypto, and utility crypto. Crypto assets generally create and process independently of a central unit, central authority, or government. These assets have several features that set it apart from physical assets. The digital environment and its created assets have a very dynamic, elastic, and slippery ground. New digital assets and currencies are generated every day. The type of taxation of crypto assets depends on their classification. The difficulty of identifying and classifying these intangible and highly dynamic assets in international standards is recognized by all. But both governments and international organizations go to great lengths to identify and classify these assets. This effort continues in incorporating gains or losses from these assets into tax systems. It should be known that there is no international classification and taxation regime accepted by all countries yet. Each country makes some arrangements or follows the positions of other countries and international organizations, considering its own economy, geographical situation, and social and political situation.

Keywords: Taxation, crypto assets, definition, taxonomy

JEL Codes: H2, K34, F38, H87

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1. Introduction

With the invention of money, it affected all economic and social relations. Before the use of money as a measure of economic value, the barter economy prevailed. In that time, the exchange of goods and services had a complex appearance. With the use of money, the way to remove this complexity is opened. People have been engaged in trade to exchange goods and services for ages. This purchase was based on payment. With the development of technology, money and payment instruments have changed radically (Square, 2019: 1).

Digital tools or assets, which are expressed as "digital exchange tools", "crypto currency", or "crypto assets" that come with crypto technology, which is the most important product of information technology, have now become an important part of the digital economy. The digital/ crypto asset system is generally not subject to any central or country and therefore not subject to a legal system and legal regulation. The market value of virtual currencies is determined by the supply and demand of money (IOSCO, 2020: 9). One of the main problems is related to defining the digital assets indeed. it has been using a variety of terms to refer to crypto assets in different stages. An analysis shows that detected the use of at least ten different terms such as Bitcoin, DLT Asset, Virtual Currency, Virtual Asset,

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Cryptocurrency, Digital Financial Asset, Digital Currency, Digital Asset, Electronic Currency, and Crypto Asset in major regulatory statements and publications. It is worth noting that a major obstacle to the analysis and formulation of clear policies for the crypto asset and blockchain industry is the lack of clear and common terminology. A variety of terms are used, often interchangeably and without a clear definition (Blandin, et al., 2019: 15, 35).

Taxation of crypto assets is not easy in these days. All governments and international institutions have tried to solve or find the solution in this respect. Like commonly accepted definition, there is not any common approach to tax the crypto assets.

In this paper, it will be put on the short crypto assets, defining initiatives and at the and some recent development of the taxation of crypto assets all around the word.

2. Crypto assets: Short History, Defining, and Classification

Cryptocurrencies have several features that set it apart from traditional currencies. It is decentralized, easy to set up and fast, anonymous, completely transparent, miniscule transaction fees, irreversible transation (Nelen, 2016: 6). It is a basic definition of the crypto asset that it is designed to work as a medium of exchange that uses strong cryptography to secure financial transactions, control the creation of additional units, and verify the transfer of assets. (Cointelegraph, 2023: 1). According to the EU The Markets in Cryptoassets (MiCA) Regulation which adopted on April 20, 2023, by the European Parliament, 'crypto asset' means a digital representation of value or rights which may be transferred and stored electronically, using distributed ledger technology or similar technology (European Commission, 2020: 1). Majority of crypto assets depend on the DLT technology.

The cryptocurrency as a pioneering of the digital assets began the 1980's as an idea. In 1995, a cryptographer David Chaum, applied an anonymous cryptographic e-money named Digicash/eCash. This form of cryptographic electronic payments that necessary user software to withdraw from a bank and required specific encrypted keys before it could be sent to a recipient. Bit Gold, frequently named a direct pioneer to Bitcoin, was designed in 1998 by Nick Szabo. In 1989, Chaum associated this system into his electronic money corporation, DigiCash Inc. DigiCash let electronic payments to become untraceable and laid the foundation for anonymous transactions (Coindoo, 2022: 1). In 2009, Satoshi Nakamoto, an anonymous programmer or a group of programmers under an alias, issued the Bitcoin. Satoshi defined Bitcoin as a 'peer-to-peer electronic cash system'. It is completely decentralized, meaning there are no servers involved and no central controlling authority. The concept closely resembles peer-to-peer networks for file sharing. There are 22,904 total cryptocurrencies in March 2023 and the total market cap of all cryptocurrencies is $1.08 trillion around. The trading volume of all cryptocurrencies per 24 hours is currently $87 billion in these days (Josh, 2023: 1).

A globally accepted standard classification of crypto assets does not exist yet. Of course, there are many reasons for this. One of them is that the crypto world has a very elastic and very rapid change. Crypto assets may indicate an asset or ownership of a presence. Researchers and various organizations have been working on the classification and identification of crypto assets for a while. In this context, various definitions and classification criteria have been put forward. These assets may call as a currency, commodities, securities, and derivatives (IOSCO, 2020: 9).

Cryptocurrencies have been classified by different units and different style such as The European Central Bank, The WisdomTree Digital Asset Taxonomy, GDF Taxonomy for Cryptographic Assets from the Perspective of General Global Regulatory Standards, Hardle, Harvey, and Reule`s Taxonomy, The three-based broad categorization, and CFI Classification. Of course, these are not the final classification indeed. We will see many of classification initiatives about in this regard.

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A technical taxonomy is made a Digital Asset Taxonomy by the WisdomTree which is a global financial innovator for a kind of mapping of the digital asset universe. In the map, digital ecosystem or in other words digital assets has been broke down into eight different categories (Kress, 2022: 1).

Figure 1. The WisdomTree Digital Assets Taxonomy

Source: WisdomTree, https://www.wisdomtree.eu/-/media/eu-media-files/other-documents/research/mo-blogs/monaco_unicorns.pdf.

The cryptographic asset classification was created on behalf of the GDF company by a group of professionals from financial services, legal and crypto-assets industry practitioners. The aim of this taxonomy is to ensure a common set of labels for crypto tokens. Crypto assets divided into three categories fallows,

- Payment Cryptos: Cryptos whose general characteristics are designed to serve as a main purpose store of value, medium of exchange, and unit of account.
- Financial Asset Cryptos: Cryptos whose main features are created to serve as or represent financial assets such as financial instruments and "securities".
- Consumer Cryptos: Cryptos that are mainly consumptive in nature, are created to serve as, or provide access to, a particular set of goods, services, or content.

These classification or taxonomy of crypto assets goes on. But simplified one is made in October 2018, by Crypto assets Taskforce in the UK, has released a report includes wide evaluation of crypto assets and the distributed ledger technology (DLT). The Taskforce has described crypto assets in three categories which are exchange tokens, security tokens, and utility tokens (Braddick, Bailey, & Ramsden, 2018: 11)

These classifications initiatives will continue until all sides are satisfied and accepted. But it is worth to noted that since digital environment is highly changeable and dynamic, it will not be easy to find the best solution in terms of classification of crypto assets. But given current data and occasion, all related sides suppose reasonable to use simplified taxonomy of crypto assets in this area.

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3. Taxation of Crypto Assets in Selected Countries

Since their relatively recent introduction, crypto assets and blockchain technology have caused various uncertainties regarding taxation. There is no specific tax legislation regarding these assets, so they are covered by the broader existing tax rules (Mace, 2023: 1). Due to the wide range of crypto assets available, the solution of how to classify a crypto asset is important. In fact, this is the prerequisite for how that crypto asset can be taxed. Because it is not always appropriate to put a crypto asset into a category, and the taxation of crypto assets brings with it many difficulties, since the use of an existing crypto asset can change over time. However, the question of which jurisdiction has taxation rights over a crypto asset, which is usually on a distributed ledger, is not a fully resolved issue. The absence of internationally accepted principles for taxing such assets increases the potential for different jurisdictions to take contradictory and overlapping positions. The European Union acted in 2022 to ensure compliance and regulate the market in the crypto asset market. In this context, the Crypto Asset Markets Regulation (MiCAR) was prepared. This directive was approved in the European Parliament in April 2023.

Governments are under significant public pressure to enact robust legislation for crypto assets and their markets regarding financial crimes and tax evasion. Unlike traditional financial assets, crypto assets can be issued, recorded, transferred and stored in a decentralized manner without the intervention of financial intermediaries or central administrators. It can mean that tax authorities lose revenue if income and gains from the disposal of a crypto asset are not properly reported on the tax return. Some of the countries' initiatives in taxation in this field are as follows.

Austria

Austria has enacted various laws regarding taxation of crypto assets, and in particular cryptocurrencies. From March 2022, it covers taxation of both current income from cryptocurrencies and capital gains in cryptocurrencies at a tax rate of 27.5%. In this context, stablecoins are also subject to taxation. Income from cryptocurrencies generated after at the end of the 2023, will be subject to withholding as capital gains at a rate of 27.5%. The tax rate that companies are subject to differs in terms of income from crypto assets. The tax rate to which companies are subject is applied as 25%. However, there is no specific regulation regarding other crypto assets such as NFTs and "asset tokens" backed by real assets such as securities or property. These products are taxed according to general tax regulations, depending on the nature of the tokens involved (Freshfields, 2023: 1).

England

If an individual is a 'buy-sell' in crypto assets, he or she will be subject to income tax on the profits made when disposing of crypto assets. As with stock trading, income from trading crypto assets is taxable if it exceeds a certain threshold. Individuals who do not trade, that is, do not constantly trade, are subject to capital gains tax (CGT) on profits from the disposal of crypto assets, including cryptocurrencies and non-fidelity tokens (NFTs) (Mace, 2023: 1).

Germany

While cryptocurrency is not completely tax-free in Germany, the country has relatively moderate cryptocurrency tax regulations. If the cryptocurrency is disposed of after being held for more than 12 months, in other words, if it is sold, there is no taxation on the profits from it. Also, short-term cryptocurrency earnings under €600 are not taxable. At the same time, if more than €600 profits are made by generating cryptocurrency income or by selling crypto after less than 12 months, taxation will be made at regular progressive income tax rates ranging from 0-45% (Brooks, 2023: 1).

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Portugal

In previous years, crypto assets were not subject to capital gains and income tax in Portugal. However, as a result of the legal regulations, taxation of income from cryptocurrencies and assets has been accepted after 2023. According to the introduced regulation, profits from cryptocurrencies that are disposed of after being held for less than 1 year should be taxed at a rate of 28%. Income from the disposal of cryptocurrencies after being held for more than 1 year is taxed with a 15% income tax rate. However, in Portugal, there are significant tax benefits for cryptocurrency. Capital gains tax does not apply to earnings from cryptocurrency held for 1 year or more. There is no common rule for classification of cryptocurrencies revenues (Brooks, 2023: 1).

El Salvador

In September 2021, it was announced that Bitcoin was accepted as a legal tender in El Salvador. Since then, the country has been actively taking steps to attract more investment into its economy through cryptocurrency. Foreign investors do not have to pay any taxes on their crypto-asset earnings. Therefore, there is no taxation on crypto income generated by foreign investors. In 2023, El Salvador removed all taxes relating to 'technological innovation' including income, capital gains tax, and property tax. As a result, income and capital gains made from cryptocurrencies are tax-exempt (Speed, 2023: 1).

India

All cryptocurrency or asset income and capital gains are taxed at a flat rate of 30% in India. There are no deductions for long-term crypto-asset gains and no tax benefits for crypto-asset capital losses. However, crypto assets are also subject to a 1% tax at source after the 30% tax is applied (Brooks, 2023: 1).

United States of America

The US does not have a specific crypto-asset tax regime. However, the US tax administration generally considers crypto assets as property and applies general US tax principles for property transactions. If crypto assets are held as capital assets, they result in capital gains or losses under general US tax principles. Unlike individuals, corporations do not receive preferential tax rates on long-term capital gains in the United States. Up to 37% tax rate for short-term capital gains and crypto income, and 0% to 20% tax rate for long-term capital gains and crypto income. However, NFTs that are considered collectibles are taxed at 28%. The amount of tax payable on crypto in the US will vary based on earnings, the transaction involved and how long the asset is held. According to the current rules in the USA, If somebody buying crypto with fiat currency, HODLing crypto, moving crypto between personal own wallets, gifting crypto - provided it has not reached the lifetime gift limit, donating crypto to charity is tax deductible, and creating an NFT does not need to pay a tax. (Talwar, 2023: 1). In the USA, any gain made from a crypto asset held less than a year is taxed at the same rate as your Federal Income Tax bracket, so between 10% and 37% in tax. However, ay gains or losses made from a crypto asset held for longer than a year incurs a much lower 0%, 15% or 20% tax depending on individual or combined marital income (Legge, 2021: 1).

Japan

In Japan, one of the first countries to adopt crypto, several crypto exchanges have been approved since 2017. This has increased the number of businesses accepting crypto payments and made it easier for consumers to use Bitcoin as a crypto asset across the country. If the crypto profit generated in a financial year is less than JPY 200,000, no tax is payable. If the total crypto earnings are less than JPY 1.95

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million, only 5% of income tax must be paid. The Japanese government actively has supported the development of blockchain technology through strategic partnerships with private companies and other institutions (Speed, 2023: 1).

4. Conclusions

Crypto assets and currencies are expected to grow rapidly, and their total value is expected to be massive in the future. The crypto world has a very dynamic, elastic, and slippery ground. New digital assets and currencies are created every day. It seems almost impossible to define, classify and control these crypto assets by international standards at least today. As a matter of fact, this field is such a flexible field that, although the usage area of a crypto asset may change over time, it can also have the ability to perform transactions in different fields at the same time. Likewise, when a crypto asset has reached a huge market value It can disappear in a very short time. At the same time, due to the anonymous nature of these assets, it also paves the way for their use for laundering the proceeds of crime.

The earnings from these crypto assets, which contain many problems, attract the attention of tax administrations. Countries and international organizations have focused on this grey area in terms of taxation. Since there is no worldwide accepted definition and classification, there is no worldwide accepted taxation regime. In today's world, there is a conflict between manual economy and management and digital economy and anonym management. It is a matter of curiosity about what will happen at the end of this process.

Crypto assets and currencies is expected to grow fast and its total value will be a huge level in the future. If the future of electronic commerce entails an increasing use of digital currencies, it is critical that our economic, political, and legal institutions are prepared to deal with them and to incorporate them into the existing legal framework. Because in the digital economy, the detection of cryptocurrency revenues and investments is not easy for tax collectors. There are also some instruments that try to track cryptocurrency investors. For example, If banks receive large transactions will ask questions and report the activity. There is no common rule for classification of cryptocurrencies revenues in terms of taxation.

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References

Blandin, A., Cloots, A., Hussain, H., Rauchs, M., Saleuddin, R., Jason G, A., . . . Cloud, K. (2019). "Global Cryptoasset Regulatory Landscape Study", University of Cambridge Research Paper. Cambridge, UK: University of Cambridge, doi: https://dx.doi.org/10.2139/ssrn.3379219.

Braddick, K., Bailey, A., & Ramsden, D. (2018), "Cryptoassets Taskforce: Final Report. London: HM Treasury", https://gov.uk/government/publications.

Brooks, M. (2023), "12 Crypto Tax-Free Countries: Investor's Guide For 2023", https://coinledger.io/blog/crypto-tax-free-countries.

Coindoo, (2022), "A Brief History of Cryptocurrency and Bitcoin", Coindoo, https://coindoo.com/history-of-cryptocurrency/.

Cointelegraph, (2023), "What is cryptocurrency? A beginner's guide to digital currency", Cointelegraph, https://cointelegraph.com/bitcoin-for-beginners/what-are-cryptocurrencies.

www.mirdec.com CONFERENCE PROCEEDINGS: FULL PAPER SERIES ISBN: **978-605-74781-9-1**

European Commission, (2020), Regulation of The European Parliament and of The Council on Markets in Crypto-assets, and amending Directive (EU) 2019/1937, https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020PC0593.

Freshfields, (2023), "Cryptoassets and tax — a snapshot", Freshfields Bruckhaus Deringer, https://www.freshfields.com/en-gb/our-thinking/knowledge/briefing/2023/01/cryptoassets---a-snapshot/.

Howarth, J. (2023), "How Many Cryptocurrencies are There In 2023?", Exploding Topics, https://explodingtopics.com/blog/number-of-cryptocurrencies.

IOSCO. (2020), "Investor Education on Crypto-Assets Final Report". Madrid: International Organization of Securities Commissions, https://www.iosco.org/library/pubdocs/pdf/IOSCOPD668.pdf.

Kress, M. (2022, 7 14). WisdomTree Digital Asset Taxonomy A Framework for the Complex Crypto Ecosystem. New York, New York, United States. Retrieved from wisdomtree.com: https://resources.wisdomtree.com/digital-asset-taxonomy/taxonomy-deep-dive.

Legge, M. (2021), "How is Crypto Taxed Around the World in the 2020-2021 Tax Year?", KoinlyBlog, https://koinly.io/blog/crypto-tax-world/.

Mace, R. (2023), "The taxation of crypto assets", Saffery Champness, https://www.saffery.com/insights/publications/the-taxation-of-crypto-assets/.

Nelen, R. (2016), "Crypto Currencies", https://indico.cern.ch/event/640641/contributions/2598825/attachments/1464272/2262991/Crypto_Currencies.pdf.

Speed, (2023), "Top 12 Crypto Tax-Free Countries 2023", https://www.tryspeed.com/blog/top-12-crypto-tax-free-countries-2023/.

Square, (2019), "History of Money and Payments", Squareup, https://squareup.com/gb/en/townsquare/history-of-money-and-payments.

Talwar, D. (2023), "The Ultimate US Crypto Tax Guide 2023", KoinlyBlog, https://koinly.io/cryptocurrency-taxes/.

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VATAMANU ANCA FLORENTINA[1] AND BOGDAN GABRIEL ZUGRAVU[2]

INVESTIGATING THE FINANCIAL DEVELOPMENT - RENEWABLE ENERGY CONSUMPTION NEXUS: EVIDENCE FROM CENTRAL AND EASTERN EUROPEAN COUNTRIES

Abstract

Increased renewable energy consumption is one of the European Union's strategic priorities in a market that combines technology, finance, and customer engagement advancements. Different opinions exist in the economic literature on the relationship between renewable energy consumption and financial progress. A lack of financial resources within an economy, in addition to a shortage of energy resources, is a major contributor to developing countries' deteriorating energy problems. Many countries have failed to address the energy concerns that have limited their potential due to a growing lack of resources and ineffective governments. Little is known about the financial sector's influence on renewable energy use. Therefore, this paper aims to investigate the relationship between financial development and renewable energy consumption for Central and Eastern European countries. The methodological background includes a panel fixed effects model for 11 Central and Eastern European countries over the period 2000–2020. The study indicates that there is a causal link between financial development and renewable energy use, highlighting the fact that flaws in the financial system hinder financing for increased renewable energy consumption. The share of domestic credit to the private sector and outstanding international private debt securities to GDP are both indices of financial development that have a positive influence on the percentage of renewable energy usage.

Keywords: Financial development, environmental quality, renewable energy, institutional quality, fixed-effect panel model

JEL Codes: F63, F65

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1. Introduction

Renewable energy sources are slowing global warming, stimulating the local economy, preserving the environment, and promoting sustainable development. According to Ibrahim Dincer (2000), renewable energy resources and their utilization are intimately related to sustainable development. In order to secure sustainable energy with fewer emissions, renewable energy sources are essential. Building up the renewable energy industry and modernizing the energy infrastructure are strategically significant steps in a country's efforts to combat climate change. Economists, governments, legislators, and academics are increasingly looking for ways to preserve a healthy ecosystem for the long term (Chaabouni and Saidi, 2017; Akbar et al., 2020). However, even though authorities and policymakers have worked very hard to consolidate the renewable energy industry, financial-related problems remain major obstacles to the country's energy revolution. It is crucial to comprehend how much a country's financial development

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contributes to the growth of renewable energy sources and, even more crucially, which components of that development are vital. Several studies have examined how financial development affects energy usage, but the findings are contradictory. According to recent research conducted by Mukhtarov et al., 2022, the usage of renewable energy is positively and statistically significantly influenced by financial development. The authors show that a 1% increase in financial development causes a 0.21% increase in the utilization of renewable energy. This point of view is also supported by Shahbaz, Muhammad, et al (2021) which highlight that countries' economic development levels and renewable energy are linked. Additionally, the authors highlight the implication of The Environmental Kuznets Curve (EKC) theory, initially presented by Grossman and Krueger, as an example of this connection. On the contrary, there are other studies which highlight a negative effect of financial development on energy consumption (Destek et al., 2018; Topcu et al., 2017; Shabaz et al., 2016). Since just a few studies have focused on European Union nations, this paper explores the relationship between financial development and renewable energy consumption for Central and Eastern European countries.

2. Data and Methodology

People are negatively affected by global warming in the form of catastrophic droughts. The preference for fossil fuels in the generation of energy is one of the main contributors to global warming. To solve this issue, more renewable energy projects need to be developed. New research that takes several indicators into account at once is required to better understand the difficulties that need to be addressed in order to improve renewable energy projects. Therefore, this paper aims to investigate the relationship between financial development and renewable energy consumption for Central and Eastern European countries. The methodological background includes a panel fixed effects model for 11 Central and Eastern European countries over the period 2000–2020.The research is based on annual time series data for 11 EU Central and Eastern EU Countries from 2000 to 2020. The renewable energy consumption (RENWENC), defined as the proportion of renewable energy in total final energy consumption, is regarded as dependent variable. Following the literature insights (Chang 2015; Sadorsky, 2010), we use four proxies for financial development: Domestic credit to private sector (DCPS) which includes financial resources provided to the private sector by other depository corporations as a percentage of GDP (%), Outstanding international private debt securities to GDP, which represent the amount of private international debt securities (amounts outstanding), percentage of GDP (%) and includes long-term bonds, notes, and money market instruments placed on international markets (OIPDS), Stocks traded, total value (% of GDP) which measure the ratio of total value of stocks traded to GDP (STTV) and the last indicator is stock market turnover ratio, which represent the total value of shares traded during the period divided by the average market capitalization for the period (SMTR). The other independent variables included in the analysis are: Economic development (ECDEV), which measure GDP per capita expressed on purchasing power parity (PPP) (constant 2011 international$) logarithmic values, consumer price index (2010= 100), which represents the average price changes for all goods and services purchased (CPINDEX), Foreign direct investment, net inflows (FDINI) which include direct investment equity flows in the reporting economy as percentage of GDP (%) and GDP growth (annual %), which capture the annual percentage growth rate of GDP per capita based on constant local currency (GDPGR). All the data was retrieved from international reliable sources, such as: World Bank, Sustainable Energy for All and International Monetary Fund, International Financial Statistics and data files. The methodological approach is based on the most pertinent prior research (Islam et al., 2013; Çoban, M. Topcu, 2013; Sadorsky, 2011 and 2009). The basic model is presented as follows:

$$RENWENC_{it} = c_0 + c_1 \times FDEV_{i,t} + c_2 \times EDEV_{i,t} + c_3 \times CPINDEX_{i,t} + c_4 \times FDINI_{i,t} + c_5 \times GDPGR_{i,t} + c_i + \varepsilon_{i,t}$$

Where i and t indicate the country and year for each variable. The dependent variable $RENWENC_{it}$ represents the share of renewable energy in total final energy consumption. The other independent

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variables are explained in previous lines. The fixed-effects general specification utilized in the analysis is described by the following equation:

$$Y_{i,t}=\alpha_i + X_{i,t} \times \beta + \varepsilon_{i,t,}$$

3. Results

The results displayed in Table 1, presents the implication of four proxies used for measuring the level of financial development. In the first model, domestic credit to private sector which includes financial resources provided to the private sector by other depository corporations as a percentage of GDP (DCPS), is statistically significant and positively affects renewable energy consumption. It is discovered that a 1% increase in financial development is associated with a 0.018% increase in renewable energy consumption, and this effect is statistically significant at 5%.

Table 1. Results from the fixed-effects regression

Variables	Model I (FDEV-DCPS)	Model 2 (FDEV-OIPDS)	Model 3 (FDEV-STTV)	Model IV (FDEV-SMTR)
FD	0.018 (1.47) **	0.386 (5.23)**	- 0.098 (2.33)*	-0.023 (0.71)
ECDEV	-0.013 (0.43)	-0.000 (1.43)	-0.003 (0.13)	-0.004 (0.70)
CPINDEX	0.191 (11.92)**	0.189 (12.61)**	0.344 (10.94)**	0.189 (11.38) **
FDINI	-0.035 (2.51)*	-0.023 (1.72)*	-0.178 (2.19)*	-0.035 (2.47) *
GDPGR	-0.017 (0.45)	0.016 (0.44)	-0.009 (0.24)	-0.008 (0.20)
Cons	1.894 (1.78)	0.573 (0.58)	2.390 (2.19)*	1.326 (1.09)
N	213	213	213	213
R2	0.71	0.74	0.72	0.71

Source: Authors.
Note: Standard errors in parentheses, ***, **, and * denote statistical significance at the 1%, 5% and 10%, respectively. The analysis in this article refers to 11 countries from Central and Eastern Europe (Bulgaria, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovenia, Slovakia, Czech Republic).

The second model captures the implication of outstanding international private debt securities, which represents the amount of private international debt securities (amounts outstanding), percentage of GDP (%), and includes long-term bonds, notes, and money market instruments placed on international markets (OIPDS). The results reported in table 1 suggest that the development of the stock market has a positive and statistically significant influence on renewable energy usage. Long-term bonds, notes, and money market instruments placed on international markets facilitate access to financial resources and allow central and eastern EU countries to develop green projects. The findings suggest that there is a positive relationship between energy costs (as measured by the consumer price index-CPINDEX) and renewable energy use. It is clear that the higher the energy prices, the more they will increase the demand for renewable energy sources. Concerning the implications of traded stocks and stock market turnover, the results show that an increase in the value of traded stocks and stock market turnover reduces the level of renewable energy consumption. These results support the idea that the effects of bank development are greater than those of stock market development in central and eastern EU countries.

4. Conclusions

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Although the current literature studies the impact of financial development on energy consumption, little research has been undertaken on the profile of Central and Eastern European nations. This paper study the relationship between financial development and renewable energy consumption for Central and Eastern European Countries. The methodological background includes panel fixed effects model for 11 Central and Eastern European countries, over the period 2000–2020. The study empirically indicates that there is a causal link between financial development and renewable energy use, highlighting the fact that flaws in the financial system hinder financing for increased renewable energy consumption. Several conclusions and economic implication are suggested by this study. First, when domestic credit to the private sector and outstanding foreign private debt securities to GDP are used as financial development indicators, there is a positive association between financial development and renewable energy use. Second, when stock market turnover is considered as a financial development measure, energy consumption in central and eastern European nations falls marginally with financial development.

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References

Akbar, M., Hussain, A., Akbar, A., and Ullah, I. (2020). The Dynamic Association between Healthcare Spending, CO 2 Emissions, and Human Development index in OECD Countries: Evidence from Panel VAR Model. Environ. Dev. Sustainability 23 (7), 10470–10489. doi:10.1007/s10668-020-01066-5.

Chaabouni, S., and Saidi, K. (2017). The Dynamic Links between Carbon Dioxide (CO2) Emissions, Health Spending and GDP Growth: A Case Study for 51 Countries. Environ. Res. 158, 137–144. doi:10.1016/j.envres.2017.05.041.

Dincer, I. (2000). Renewable energy and sustainable development: a crucial review. *Renewable and sustainable energy reviews*, *4*(2), 157-175.

F. Islam, M. Shahbaz, A.U. Ahmed, M.M. Alam, Financial development and energy consumption nexus in Malaysia: a multivariate time series analysis, Econ. Modell. 30 (2013) 435e441.

G.M. Grossman, A.B. Krueger, Economic growth and the environment, Q. J. Econ., 110 (1995), pp. 353-377.

G.M. Grossman, A.B. Krueger, Environmental Impacts of a North American Free Trade Agreement. NBER Working Papers Series, No. 3914, National Bureau of Economic Research, Cambridge, MA (1991).

M. Shahbaz, H. Mallick, M.K. Mahalick, P. Sadorsky, The role of globalization on the recent evolution of energy demand in India: implications for sustainable development, Energy Econ. 55 (2016) 52e68. https://doi.org/10.1016/jeneco.2016.01.013.

M. Topcu, J.E. Payne, The financial development eenergy consumption nexus revisited, Energy Sources Part B 12 (2017) 822e830.

www.mirdec.com CONFERENCE PROCEEDINGS: FULL PAPER SERIES ISBN: **978-605-74781-9-1**

M.A. Destek, Financial development and energy consumption nexus in emerging economies, Energy Sources Part B 13 (2018) 76e81, https://doi.org/ 10.1080/15567249.2017.1405106.

Mukhtarov, Shahriyar, Serhat Yüksel, and Hasan Dinçer. "The impact of financial development on renewable energy consumption: Evidence from Turkey." *Renewable Energy* 187 (2022): 169-176.

P. Sadorsky, Financial development and energy consumption in Central and Eastern European frontier economies, Energy Policy 39 (2011) 999e1006. https://doi.org/10.1016/j.eneco.2013.04.001.

P. Sadorsky, The impact of financial development on energy consumption in emerging economies, Energy Policy 38 (2010) 2528e2535. https://doi.org/10. 1016/j.enpol.2009.12.048.

S. Çoban, M. Topcu, The nexus between financial development and energy consumption in the EU: a dynamic panel data analysis, Energy Econ. 39 (2013) 81e88.

S.C. Chang, Effects of financial developments and income on energy consumption, Int. Rev. Econ. Financ. 35 (2015) 28e44, https://doi.org/10.1016/ j.iref.2014.08.011.

Shahbaz, Muhammad, et al. "The effect of financial development on renewable energy demand: The case of developing countries." Renewable Energy 178 (2021): 1370-1380.

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IRINA ANA DROBOT[1]

FASCINATION WITH ANCIENT MYTHS NOWADAYS IN NOVELS

Abstract

Ancient mythology has always been around, starting with its frequent presence in Renaissance paintings, going on with dictionaries and stories based on these myths, such as, in Romanian literature, the Legends of Mount Olympus, by Alexandru Mitru (initially published in 1960), going on with various popular books regarding mythology of Northern cultures, not only ancient cultures, and continuing nowadays with works of fiction. Novels such as Circe by Madeline Miller (2018), Ariadne by Jennifer Saint (2021), and Elektra by Jennifer Saint (2022) offer the point of view of the title characters and focus on their story, with all the details that concern them. Throughout time, story rewriting has been constant practice. The epics of the Illiad and Odyssey, originally written in verse form, have been retold in prose in order to be easier to read by a modern audience. Now, we find rewritings of the story from the perspective of characters such as Circe, Ariadne and Elektra. The reason could be simple wish to prove that these stories can still spark the imagination and that they are universally appealing. At the same time, since they are about female characters, we could relate this to the constant struggle throughout history of women to receive rights and recognition. In our present world, minority rights and, included in them, women's rights, are part of the contemporary political ideology and, therefore, these books could be included within this trend. Fiction is a reflection of values and mindsets which are relevant for our contemporary times.

Keywords: Rewriting, minority rights, imagination

JEL Codes: Z10, Z11, Z13

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Introduction

Ancient Greek and Roman mythologies have been, throughout history, part of literature works, as well as part of various cultural products, created in media as diverse as painting, sculpture, and film. These mythologies have been present throughout mainstream culture, in the epic poems by Homer and Virgil, in ancient Greek tragedies (e.g. *Elektra* and *King Oedipus* by Sophocles), in retellings in prose in various cultures, not only in the Romanian one, dedicated especially to children and young readers, and now, more recently, as part of popular culture, with the stories being further developed as far as some minor characters in the usual mainstream writings are portrayed and mentioned. Additionally, some personality features of the characters only mentioned and details of their story that had not been fully focused on have been developed in the popular culture fiction books written by Jennifer Saint and Madeline Miller. Moreover, throughout the ages, references to heroes in ancient Greek and Roman mythology have been present in poetry. For instance, Joachim du Bellay writes, around approximately 1559, a sonnet with references to Ulysses, called *Happy, Who Like Ulysses*... The sonnet makes an analogy between the returning home of Ulysses, after many years of fighting in the Trojan war, and afterwards setting on a long journey home and going through many obstacles and adventures, as depicted in Homer's epic poem, and a contemporary man, thinking with nostalgia about his home in his native village.

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We could see right away, from the example of Joachim du Bellay's sonnet about Ulysses, how audiences can sympathize with the heroes in ancient mythology. At the same time, we can see how identification with these heroes can occur, as the hero's deeds and life situation can be universal: maybe the poetic persona has not gone like Ulysses through all the adventures, yet he uses the analogy with Ulysses' situation in order to express the strength of his feelings of longing to reach home. Sympathizing with a certain character in mythology, like Ulysses, can be at work for both readers and writers in the recent novels by Madeline Miller and Jennifer Saint, only that they mainly choose minorities, such as women, Circe and Elektra, in the novels with the same titles as the names of the heroines, and a romance between two men, Achilles and Patroclus, depicted by Madeline Miller in *The Song of Achilles*, ancient mythology heroes. *Medusa* by Jessie Burton (2022) is another example of novel that is a retelling of the myths from the perspective of a woman, rewritten from a feminist perspective. Some readers can confront themselves, during contemporary times, with these same issues, such as feeling marginalized and not being granted equal rights, or not being completely accepted by other people, regardless of laws and raising awareness about minorities' rights. At the same time, some readers have reacted against the ideas in Madeline Miller's *The Song of Achilles*, claiming that she has distorted the original story, as Achilles was not indifferent to women's charms. We could speak about rewriting of the original stories, with certain changes in them, and insisting on certain parts of the story that are further developed, to suit the needs of the writers and some readers, just as in fan fiction literary works. There, based on a film, film series, novel, or book series, the fans can imagine further stories about these characters, and also put them into entirely new situations, according to their fantasy needs. This could be visible starting with references in poems such as Joachim du Bellay's sonnet, or in further developments of the original epic poems by Homer and Virgil visible in ancient tragedies such as *Elektra* and *King Oedipus* by Sophocles. In these cases, of the poem and tragedies, the stories are adapted to other media, a fixed poetry form, the sonnet, and a dramatic rendering under the form of tragedy, which can be both read and acted on stage. We could see these examples as early forms of what we now refer to as rewriting in contemporary literary works.

Leaving aside the rewritings of Madeline Miller and Jennifer Saint, we also have other forms of rewriting nowadays, recognized by literary critics, such as Ilasca (2022, p. 964), who claims the following: "Starting with Aeschylus' *Prometheus Bound*, and moving on to Marry Shelly's *Prometheus Unbound*, […] Hécatombeon has a different angle: an ironic approach to a 'grand narrative' that ridicules ideas and characters throughout the play." We could claim that rewriting ancient myths is a common practice nowadays, especially since we use this practice in order to discover hidden facets that can be relevant in today's world, as well as to satisfy the readers' imagination. After all, the impact of the ancient myths is so high that we realize how our imagination is constantly sparked up by them. We notice generations of young readers being captivated by them, and it comes out as natural to read more on these myths once we tend to imagine more and more regarding these stories in particular. Writers, however, put these stories and imagining up for readers to see and read for themselves.

The old epic poems that are the main source of our knowledge of ancient mythology from the Greek and Roman worlds have been rewritten and retold throughout time, starting from retelling them in prose, in order to be easier to be read, continuing with reimagining them in Renaissance painting, with making references to the characters in other works of fiction, and ending up with retelling them from a way that is considered relevant to our contemporary values and mindset. It is current practice to go back to the past for drawing up from there those values and principles that are considered to be relevant in contemporary times, as the past can be understood as setting up a foundation for the way our current world is working or should be working.

The Iliad (written around 800 BC) and *The Odyssey* (written around the 7th-8th century BC) are attributed to Homer, while the *Aeneid* (30-19 BC) was written by the Roman poet Virgil. The *Iliad* deals with the confrontation between King Agamemnon and Achilles the warrior, and as a time period it is situated

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towards the end of the Trojan War. This war was fought over the beauty of Helen. *The Iliad* can be considered "a prequel to *The Odyssey* and *The Aeneid*" (Bowers, 2006). *The Odyssey*'s topic is the journey of the King of Ithaca, hero Odysseus, back home after fighting in the Trojan war.

These epic poems are the basis for further works that are known to us, the Romanian readers, such as *Legends of Mount Olympus (Legendele Olimpului*), comprising two volumes, *The Gods* (*Zeii*) and *The Heroes* (*Eroii*), by Alexandru Mitru (initially published in 1960), as well as *The Iliad. The Odyssey. The Aeneid. Retold for everyone, and especially for children* (*Iliada. Odiseea. Eneida. Repovestite pe intelesul tuturor/ Repovestite pentru copii*), by George Andreescu. These are all examples of retellings of the old epic mythologies, as it is considered that they should be told in an accessible form to us today. Indeed, the lyrical form can be more difficult to decipher and to follow. Nowadays, we tend to prefer prose to poetry, since it is considered clearer. Poetry is perceived as difficult to decode, due to the figurative language. At the same time, we should be aware that we deal with different types of poetry, and not limit our conclusions based on certain impressions during literature lessons at school.

We can notice, from the point of view of a fast, intuitive classification, the following: books retelling the myths, as well as books adapting and emphasizing present-day concerns about the myths, to the point where they are reinterpreting them. In the second category we can notice the book *Mythos* by Stephen Fry, where the relationships are presented from a contemporary perspective, e.g. "Fry is unusually sensitive to the contemporary resonance in myths about gay gods and heroes and the transgender Hermaphroditus" (Hall, 2017). We are told by Hall (2017) that "Fry's retellings have stiff competition, are limited in selection and sometimes appear to be set in North London. But they have real charm." On this occasion we find out about more books that are retellings of the myths, e.g. "Nathaniel Hawthorne's *Tanglewood Tales* (1853), Edith Hamilton's *Mythology: Timeless Tales of Gods and Heroes* (1942) and Robert Graves's *The Greek Myths* (1955)", together with "Simon Russell Beale's audiobook of *Atticus the Storyteller's 100 Greek Myths*" (Hall, 2017). Fry has also written a second volume, *Heroes*. Therefore, whereas the books enumerated as competition by Hall (2017) and the books mentioned from Romanian culture can be objective retellings of myths, there are books, such as Fry's *Mythos*, which retell the stories from the perspective of relationships, which can be seen as one of the main topics these ancient myths deal with, from a contemporary point of view, of giving priority to minorities. Yet, this is not where the classification stops. We can also consider the way the ancient myths are reinterpreted through the filter of Renaissance paintings, where Renaissance aesthetics are strongly included in the depiction of scenes from these myths and of the characters. We can also think of the novel *Ulysses* by James Joyce, which makes references to myths, but clearly retells the story from an everyday life perspective, to the point where it is an entirely different one, about life in Ireland at the time of Modernism. Other stories, such as those by Madeline Miller and Jennifer Saint, retell the stories focusing on the perspectives of certain characters, which are believed to be the perspective of minorities, such as women and, once again, gay relationships. The first are illustrated by *Ariadne* by Jennifer Saint (2021), *Elektra* by Jennifer Saint (2022), *Circe* by Madeline Miller (2018), and the latter is illustrated by *The Song of Achilles* by Madeline Miller, where the relationship between Achilles and Patroclus is described as more intimate than just a friendship.

An aspect to keep in mind is that prose was the first means of writing *the Aeneid by Virgil* (Mackie, 2017), so it may be considered the most natural form for telling a story. According to Mackie (2017), "Virgil wrote it first in prose, before developing the poetic version." The purpose of the Aeneid, along with presenting the adventures of this hero leading the survivors of Troy "through the Mediterranean, and ultimately to the site of (future) Rome. The *Aeneid* is therefore a classic foundation narrative" (Mackie, 2017).

Yet, nowadays, these mainstream stories of ancient Greek and Roman myths coexist with those newer ones, under the form of rewritings, and which give voice to present-day concerns. The old, mainstream

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way of understanding myths cannot be done away with, as these myths are considered the foundation of European culture and of our general culture. At the same time, the practice of rewriting is a constant in today's world, as we notice various new fiction books appearing and dealing with new, detailed and adapted versions of old stories, in order to suit our present-day needs and expectations.

Materials and Methods

Why the focus on minorities and on their relationships in myths in today's world? It could be since equality from all points of view is considered a main issue nowadays, of both human rights and political correctness. We tend to think in these terms and to apply this grid of values and relationships everywhere. Here, in the myths, it is applied retrospectively. We reimagine the past myths in a way they were not intended at the time. Instead of applying, retrospectively, cultural studies frames of interpretation such as Feminism and Queer theory, as the situation in the past was different from today, as minorities would not be regarded, at least in an ideal, theoretical way, as equivalent to mainstream values and mindsets, in spite of all the struggle for equality, authors begin to, purposefully, rewrite literally the ancient myths focusing on the characters that can be understood, through their behaviour, as representative for today's values and principles.

We could refer to Baciu's (2013) grid of culture identity manifestations, including the following categories: symbols, values, rituals, traditions, practices, as well as heroes and/ or personalities. By applying this grid to ancient myths, we could realize that the categories are adapted to today's mindset. Cultures can be understood as differing with respect to different ways of thinking and of resorting to action (Baciu, 2013), therefore, we could only notice the way that heroic behaviour, during the war, is considered universal. At the same time, values such as giving rights to everyone and treating everyone as equal can be utopic, though it is an ideal value in today's world. Minorities such as Circe, Elektra, judging by the way they are female characters, and not given enough time and attention to speak in the mainstream stories. Circe is a minor character in *The Odyssey* by Homer, and she is a witch that turns Ullysses' men into animals. Definitely, not much attention is paid to her by the readers, as she is simply considered an episodic character, as all the attention is focused on the hero Ulysses. Yet, Madeline Miller takes her imagination further and makes Circe into the main hero of her story. Contemporary readers can feel that Madeline Miller answers their curiosity about the character of Circe, and not necessarily tie this act to one of political significance, giving voice to women, who had been discriminated in the mainstream story by Homer. Perhaps it was simply because the focus was on the hero Ulysses, as the title of the epic narrative in verse form was suggesting. At the same time, we can interpret Madeline Miller's act of imagining an entirely different *fabula*, based on already known work by Homer, by using the term in Narratology, from what we had previously known, as suggesting she does not feel that Circe is given the opportunity to speak for herself. Miller can be understood, through her work *Circe*, as being a reader turned into a writer in her own right, and offering not just a *fabula*, which means a form of the story that is the result of the readers' interpretation and not there on paper, in this case, in Homer's story, but, eventually, an entirely different story, based on Circe's account. According to Cobley (1994), *fabula* only means the "raw material of the story." Madeline Miller develops the story material into a concrete novel of her own. It can be expected of the readers to wander further into episodes in a story that are not fully developed, but which catch their imagination and curiosity. These curiosities may or may not develop into fan fiction, or into further stories, such as the ones by Miller and by Saint.

If we look at book reviews to Miller's *The Song of Achilles*, on Goodreads community, we can find, among the reactions, one that claims that Miller has the merit of being authentic to the original story, as she did not censor anything; on the contrary, she simply showed the story the way it genuinely was, with Achilles and Patroclos in love, with feelings of passion, and not only as friends, as they have been depicted in the screen version of the film *Troy* (2004), for example. This reaction, found in a comment under the form of a book review of Miller's novel on Goodreads, shows how readers react to

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contemporary versions of myths. This is an example of positive reaction to Miller's rewriting and, at the same time, of the fact that novels are dialogic, according to Bakhtin (2010). Such forms of rewriting, by Miller and Saint, can be seen as means of establishing dialogue between authors and readers: the writer creates the story on the basis of a shared meaning and understanding of the respective stories (Clark, 1990; Englert and Mariage, 1991). We could rely in the case of these new stories on the fresh perspective based on the understanding of presenting minorities' point of view in a way that is perceived as authentic by readers, and in a way doing justice to the characters that have been, until then, ignored or not paid enough attention in previous versions of the story. Characters that are perceived as minor as they have a small part in mainstream narratives, such as Circe in Homer's story, can still be found if we search for them in any dictionary of mythology, and they have a place granted there, similarly to other characters, to whom a larger part of the story had been dedicated in the ancient epics.

However, readers can feel that, due to the small amount of space given to these characters in the mainstream epics, they may have not been given enough attention or enough time to share their story and to argue in favour of their perspective. We could make an analogy with the character of Bertha, or the first wife of Mr Rochester, who is not given the proviledge to offer her own perspective of the story in the novel *Jane Eyre* by Charlotte Brontë. This perspective is made available to the extent that it occupies an entire novel in *Wide Sargasso Sea* by Jean Rhys. The readers find in Rhys' novel an entirely different perspective on the character of Bertha Mason, an otherwise minor character in the novel *Jane Eyre*, and which is presented in such a way by Brontë that the reader does not give much attention to her, and does not manage to sympathize with her. The fresh perspective given on her is not only a matter of artistic craft, but a matter of women's and minority's rights, just as in the case of the characters in ancient Greek and Roman myths. It is not a matter of an alternative scenario only to the story, or a simple question of wondering "What if…?" but a matter of understanding the story from the perspective of characters that can, otherwise, be marginalized and not considered as equal in rights with the others. In this sense, the fictional world can be seen as a reflection of the real world. We can give as proof certain very strong reactions on the part of the readers, such as in the example of the reaction to the way Miller depicted the relationship between Achilles and Patroclos, as a relationship of passion, and not of a devoted friendship, which is the way it is presented in rewritings, or, better put, retellings, destined for children and a young audience. At the same time, friendship and romantic relationships both contain an element of libido investment, from the perspective of Freud's psychoanalytic theory (Rawlins, 1982), which could make the two quite close together, and not as being understood only according to clearly established boundaries that can separate them. This could make the relationship of Achilles and Patroclos as open to interpretation, and therefore various versions of the story could be acceptable.

The way the characters behave in relation to one another has not changed through the ages, with respect to the heroes presented in ancient Greek and Roman myths. Ancient Greek and Roman myths are often about various issues with respect to relationships: sudden falling in love, anger, will to revenge, or avenge, honour, as well as relationships between men and men, which can be topics of concern nowadays, with respect to how such relationships are tolerated and accepted in our times. What matters nowadays especially is the way certain behaviours are considered acceptable in society or not. By going back to ancient myths, we can seek to show that such behaviours are strictly a personal preference, and that the value of a person has nothing to do with this. Ancient heroes in myths could be different with respect to relationships preference, yet their heroic deeds would still be considered outstanding. References to such myths can be understood as encouraging for the value of such persons nowadays, and for offering to society examples showing that such persons, involved in different kinds of relationships, would not have any behaviour that would disrupt commonly accepted moral values, as in the past they could be usual heroes anyway. Therefore, this would just be a personal preference, of private concern, which would not affect negatively society at large and would not change its values.

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Our society is concerned with issues such as equality and the rights of minorities, together with their human and professional value.

Ancient myths are considered to be universal, so it can be easy to see in them issues of personal concern and also of concern with respect to the society we live in at a certain historical time. We can notice how heroic behaviour was emphasized in television series, *Hercules: The Legendary Journeys* (1995-1999) and *Xena, Warrior Princess* (1995-2001). The setting was depicted as one of fairy-tale and legend (Selling, 2004, p. 212), while the way the heroes acted and talked were strikingly contemporary. Film adaptations of episodes in ancient mythology can focus on the adventures that these characters go through, such as *Jason and the Golden Fleece* (2010 film series), also known as *Jason and the Argonauts*. The viewers' and readers' enjoyment of adventure is universal, which is why these stories can be appealing at all times, regardless of them being rewritten or not. The adaptation to another medium, such as the film, could also be interpreted as a form of rewriting. The ancient myths have been adapted to various mediums and mindsets. Due to the structure of the hero's journey described by Joseph Campbell (2003), involving stages such as refusal of the call to adventure, acceptance of the call, going through obstacles, getting helpers and opponents, succeeding in tasks, returning in order to share with the community the experience, which is present in myths, fairy-tales and fantasy books, these stories can also be retold for children and be considered enjoyable by them and relevant to them. Therefore, ancient myths can be relevant to various ages, audiences and for promoting various values and mindsets. Relationships are at the core of the ancient myths. Since the world at all times in history has been based on relationships. It is impossible not to interact with the others, based on various sector of life experiences: friendships, romance, war, hierarchy-based relationships, status based on birth (whether one is a God or human, just as in history there were nobles and commoners), alliances, plotting, etc.

The fights between ruling gods are fights for power, just as we can find at the level of human society, among kings, leaders, rulers and members of the elite. Human emotions such as jealousy, anger, wish for revenge, wish to get the love of someone, the wish for power, for seeing again the loved ones, for returning home, are present in both worlds, of the humans and of the gods. The wish to share fire with humanity is the wish to share any invention and discovery. From this point of view, the myths are universal and we can relate to them at all times in history.

One particularity of the ancient gods' world is that they constantly interact with the human world. They always watch them, help them, or create obstacles for them, function of their interests. We can see the difference between the religious world of the Western world and the humans' world, which is generally seen as separate. Instead, gods in ancient myths show human feelings and the two worlds are not separated by clear boundaries. The relationships form a web of interests, comparable to those at a political level, but also an emotional web of interests, once gods and humans fall in love. We can see the gods as members of a social elite, aristocracy, and the humans as commoners, yet there is interaction between the two which is not found in the real world.

The gods show lots of human traits. Ethically, they are not perfect. They can be jealous, they can cheat in their relationships, they can take revenge. For example, in *The Aeneid*,

> As with other ancient epics, our hero has to remain resolute in the face of significant divine hostility. Juno, queen of heaven and goddess of marriage, despises the Trojans because she lost a divine beauty contest known as the Judgement of Paris. Venus wins the Judgement by giving a bribe to Paris, a Trojan prince who acts as judge. The bribe is in the form of Helen of Sparta, the most beautiful woman in the world. Paris prefers this bribe to the bribes of the other two contestants - Juno and Minerva. (Mackie, 2017)

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The ancient gods can be seen in opposition with the saints of the Western world, who were examples of virtue and detachment from this world. They enjoy life and live life just like humans, only that, while the latter are mortal, gods are immortal.

The old books about ancient Greek and Roman mythology can be understood as the basis for new stories, and as a foundation for new ways of looking at and reflecting on our present world and its state of affairs. The idea of relationships can be discussed further on based on these ancient Greek and Roman myths, and they can provide a starting point for new stories, focusing on present-day concerns. The process can be understood in a similar way to the way Freud understood the process of dream-work (Freud, 2009), or free associations (Aron, 1996): starting from a commonly shared story or known hero, the dreamer or patient, or, in our case, the contemporary day writer, imagines a story related to the current concerns with respect to relationships and the way such relationships are or not accepted in contemporary society, or simply frowned upon. The original myth can be seen as being a bit distorted, or only changed a bit, or developed further on in detail, in a way it was not considered in the original versions. These further developments could be understood as alternative scenarios for today's world with respect to relationships, in the sense that we could have different mindsets in today's world, different ways of thinking, different values, which could lead for us to accept the world and the relationships as described in the rewritings by Miller and Saint, and consider these ones normal. Fiction can help us consider various alternative worlds and scenarios, the same way as utopias and dystopias are introduced in novels and the same way that readers consider the worlds included there possible, or relatable to some society members' wishes and hopes, or fears.

As an example, Circe has been considered in research as "an allegory of the women's struggle during the Feminist movement" (Öncel, 2019). Widananto (2022) further develops the feminist perspective on the world in Circe described by Miller: "important the decisions in the story are only decided by the male gods," while "The goddesses in this story almost only play the role of housewives who are servants of their husband," and, what is more, "these goddesses often get sexual harassment and violence from other male characters." Widananto (2022) continues, claiming that we can see in Miller's version of the story, clearly, "the patriarchal culture run by the gods." The feminist perspective on Greek mythology is a well-known reality in fiction writing today: "Feminist retellings of Greek mythology started as a niche subcategory of the historical fiction genre in the mid-2000s with stories like *The Penelopiad* by Margaret Atwood, *Lavinia* by Ursula K. Le Guin, and *The Memoirs of Helen of Troy* by Amanda Elyot" (Bretzinger, 2023, p. 4).

Researchers and critics can also be seen as readers, who have reactions to literary texts, and establish with them forms of dialogue. At the same time, they offer their perception of the text, together with their interpretation based on argumentation and support by previous research.

As some readers are preoccupied with a certain issue, they can go as far as to see it in every work of fiction. We can see this in relation to the ancient world described by myths. The world was ordered back then hierarchically, it was high power distance, in Hofstede's terms (2011), which meant authority was to be obeyed at all times. This is a reason why equality, in the sense that we understand it today, as practiced in our contemporary society, could not find its place in the ancient world and, therefore, in the ancient world described in the myths by Homer and Virgil. It is thus easy to find examples of what we consider revolting order of society and accompanying behaviour in the ancient world there in the literary works by applying our own mindset we have been taught by today's culture and society. We could claim that the structures of the ancient world are considered by authors doing the rewriting and by readers as being symbolic of the patriarchal, authoritarian society, where equality between men and women is not found, and, therefore, the world of ancient Greek and Roman myths could only be a pretext for creating a setting for the novels of the contemporary authors helping readers see the point clearly. One of the issues is that the old society's order can be still felt today, perhaps less under the form of laws and

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professional possibilities, but rather under the form of stereotypes, misconceptions, misunderstandings, and judgement: "Patriarchy can still be found in society because of the lack of attention and knowledge about patriarchy" (Widananto, 2022). Indeed, the genre of rewriting Greek mythology from a feminist perspective is growing in popularity, as "readers want and need these stories because they comment on the struggles that women continue to face in the twenty-first century" (Bretzinger, 2023, p. 4). Readers perceive the situation of women back in ancient times as not different from the situation today: "the sufferings and plights of Greek culture's women are the same as the women of today's society" (Sarwar and Fatima, 2022, p 339).

Fiction can allow anything, including mixture of contemporary mindset and values, lifestyle, which is juxtaposed on the ancient world and the point is that what we want in today's world, meaning equality between men and women, as well as acceptance of diversity and different kinds of relationships than the usual, standard ones, cannot be found in a traditional world order, which is exemplified by the ancient times described in myths through the relationships among the characters. The contrast with the ancient world and the contemporary mindset present in the works of Miller and Saint can be used to serve as a powerful argument to show why we need to feel revolted by the injustice regarding equality between men and women, and in general, acceptance of diversity with respect to relationships preferences. The contrast makes the impact very powerful and can make readers to see the issues discussed in our present-day society very clearly.

Results

Ideology can influence the way art is produced and, in this case, the way literary productions retell myths of the past by applying the mindset of today's world.

Art is used to make a powerful point, influencing the readers in the case of raising awareness about the issues discussed in our contemporary society. Such stories, by Miller and Saint, can prompt readers to rise to action, making their beliefs stronger and feeling that they should fight for their rights, and to sustain the minorities in the injustice that can be done to them. The setting of the ancient world of mythology of Greek and Roman cultures, coupled with the mentality of today and fighting for equal rights makes a powerful emotional impact on the readers, who are directed by the authors to interpret the stories from a feminist perspective. The narrators can twist previous understandings of the myths and draw attention to details readers have, over the years, apparently not noticed, but which are there and which show a reflection of the situation of the world today. Fiction can be used to draw attention to social issues, which are of collective concern for our contemporary society. This is one reason why concerns such as equal and human rights are presented in such a powerful way in the retellings of the stories in ancient Greek and Roman mythologies, from the perspective of female narrators, and dealing with various types of relationships which are under discussion today to be accepted wholeheartedly by society.

Leaving ideological issues aside, we should keep in mind that ancient myths are universal and can allow for the use of symbols and characters to suit various purposes, as these myths can be understood as shared knowledge by contemporary audience members. We know that the ancient Greek and Roman cultures and civilizations have shaped the world as we know it today from a variety of points of view, including setting up a common basis of myths that we can now refer to and be understood in European cultures. Therefore, references to characters in ancient Greek and Roman mythology have been used in literary works in the past to highlight the way the poetic persona is feeling and to transmit this feeling to the readers, e.g. in Du Bellay's sonnet.

The stories in ancient Greek and Roman mythology, in their ancient, or retold, rewritten forms can also be regarded as fantasy and adventure stories, as we can find them in the form they are retold for children,

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in order to make them familiar with these myths. They have several sides to them and, therefore, several perspectives from which they can be interpreted, one not excluding the others. The underlining of the feminist perspective and minority rights is one educational purpose with which myths can be used. Otherwise, they can be used to better understand human nature, with its emotions, and the way falling in love, revenge, friendship, and honor work.

Discussion

The stories giving the perspective of Circe, Elektra, Medusa, and Achilles can be understood as both offering the right to speak for minorities, as well as presenting reality from different subjective perspectives since, with Modernism and Postmodernism, there is no longer one single, unitary, objective truth. The mainstream culture is itself divided into several niche cultures or subcultures. There is no longer one unified trend in the literary production of the contemporary world. As Vianu (2006) stated, in our contemporary world, every author creates his/ her own trend, "refusing similarity" (Vianu, 2006, p. 155): "The word is 'each for himself,' everybody their own trend" (Vianu, 2006, p. 8). This statement could be related to the fact that nowadays we live in a world of increasing individualism worldwide (Hamamura, 2012; Santos et al, 2017), meaning that we try to differentiate ourselves from the collectivity, to stand out through our own opinions, to focus on our own individual interests instead of those belonging to the entire collectivity, and that, through having characters in mythology expressing their perspectives and opinions, we hear their side of the story, just as it is usual to ask, for instance in English seminars at universities in Romania, for students to write essays where they argue for or against an issue, or where they argue for their own opinion related to a topic they are assigned.

Myths can be understood as common references that we can use in our contemporary world (Drobot, 2017), with various purposes. In this case, the purpose, for *Medusa* by Jessie Burton, *Circe* by Madeline Miller and *Elektra* by Jennifer Saint, is to present the story from a developed, detailed perspective of women, giving the readers the occasion to know and to understand them better than as episodic characters, otherwise, present in mainstream versions of the ancient myths.

The way contemporary works of fiction focus on contemporary issues which are introduced in ancient times and with repsect to ancient myths can remind of the way plays by Shakespeare, about kings back in history, acted at the court of Queen Elizabeth I, could make allusions to the current ruler and the current state of the country. The past has, therefore, been used as reference point for various contemporary issues at all times, and for various purposes, and this is the way ancient Greek and Roman myths are currently used with respect to the niche of rewriting the old myths from different perspectives.

Conclusions

Myths can be relevant throughout the ages, since they can be seen as both universal and adaptive to be used for various purposes. In the case of raising awareness about issues of equality and rights, we can see as a purpose the well-being of such minorities in society. We are currently living in a society where these issues are constantly raised, and laws being created to protect the interests and rights of minorities. With the issue of minority rights, we are also being reminded about the true value of a personality and what the respective minorities can do for the well-being of the entire society, since they could contribute to it with what they are good at. At the same time, the issue of the spreading phenomenon of individualism in cultures all over the world raises the issues of the individual's interests and the way each and every individual should be accepted and respected for what he/ she is. The changing world, starting from the industrialization age, when individualism could develop due to the availability of resources, and on the citizens' no longer depending on the community for survival, with having the population move from the rural areas to the city areas, then moving on to the removal of the old feudal, hierarchical order of society to a society based on social contract and equal rights, leads to various issues

appearing constantly. The wish for equal rights is a consequence of the changing structure of society and of the growing availability of resources. From the wish for well-being related to material resources, societies claim the wish for well-being at the level of psychology and of not being judged according to old ways, which becomes visible in the rewritings of ancient Greek and Roman myths from the perspective of otherwise minor characters, who were not given a full part in the original, ancient stories. The readers can find themselves as judges, if they are knowledgeable about the original ancient stories, and to witness now the perspectives of the other characters, in order to have a better understanding. Yet, the rewritings having to do with minority rights are deliberately written in such a way so as to persuade and to draw attention, giving the readers the feeling that they are witnessing an authentic account, of what had truly happened and had not been told completely until then. We could claim that the mainstream perspective, of the mainstream, original ancient stories, is questioned, in a manner specific to Postmodernism.

References

Andreescu, G. (2016). *Iliada, Odiseea, Eneida repovestite pentru copii*. Amalgama.

Aron, L. (1996). From hypnotic suggestion to free association: Freud as a psychotherapist, circa 1892–1893. *Contemporary Psychoanalysis*, *32*(1), 99-114.

Baciu, Sorin. (2013). Culture: An Awareness-Raising Approach. Cavallioti Publishing House, Bucharest, Romania.

Bakhtin, M. M. (2010). *The dialogic imagination: Four essays*. University of Texas Press.

Bowers, Gwen. (2006). *The Iliad, the Odyssey, and the Aeneid*. Scholastic Teaching Resources. New York, Toronto, London. Retrieved from: https://www.kyrene.org/cms/lib/az01001083/centricity/domain/893/illiad_odyssey_epic_plays.pdf.

Bretzinger, Brenna R. (2023). Feminist Retellings of Homer's The Odyssey, 2005-2022. Honors Capstones. 1452. https://huskiecommons.lib.niu.edu/studentengagement-honorscapstones/1452.

Burton, Jessie. (2022). *Medusa*. Bloomsbury YA.

Campbell, J. (2003). *The hero's journey: Joseph Campbell on his life and work* (Vol. 7). New World Library.

Clark, G. (1990). *Dialogue, dialectic and conversation: A social perspective on the function of writing*. Siu Press.

Cobley, Paul. (1994). Narratlogy. In Groden, M., & Kreiswirth, M. (1994). *The Johns Hopkins guide to literary theory & criticism*. Johns Hopkins University Press.

Drobot, Irina-Ana. (2017). Myths as Common Cultural References. In Iulian Boldea (Editor) Literature, Discourse and the Power of Multicultural Dialogue, Volume no. 5, Tîrgu-Mureș, Mureș.

Englert, C. S., & Mariage, T. V. (1991). Shared understandings: Structuring the writing experience through dialogue. *Journal of Learning Disabilities*, *24*(6), 330-342.

Freud, S. (2009). The dream-work. *Cultural Theory and Popular Culture: A Reader*, 246-254.

Hall, Edith. (2017). *Mythos Review – the Greek myths get the Stephen Fry treatment*. https://www.theguardian.com/books/2017/nov/22/mythos-a-retelling-of-the-myths-of-ancient-greece-by-stephen-fry-review.

Hamamura, T. (2012). Are cultures becoming individualistic? A cross-temporal comparison of individualism–collectivism in the United States and Japan. *Personality and social psychology review*, *16*(1), 3-24.

Hofstede, G. (2011). Dimensionalizing Cultures: The Hofstede Model in Context. *Online readings in psychology and culture*, *2*(1), 2307-0919.

Lasca, I. Hécatombeon - A Dramatic Rewriting Of The Myth Of Prometheus. In Iulian Boldea (Editor) *Journal of Romanian Literary Studies,* issue no 28/ 2022, Arhipelag XXI Press, Targu Mures.

Mackie, Chris. (2017). *Guide to the Classics: Virgil's Aeneid*. Retrieved from: https://theconversation.com/guide-to-the-classics-virgils-aeneid-85459.

Miller, M. (2019). *Circe*. Grupo Editorial Patria.

Miller, M. (2021). *The Song of Achilles*. Bloomsbury Publishing.

Mitru, Alexandru. (2011). *Legendele Olimpului*. Editura Vox.

Öncel, İ. M. (2019). Victim or Witch? Circe as an Allegory of Women's Struggle during the Feminist Movement. Retrieved from: https://www.academia.edu/43648609/Victim_or_Witch_Madeline_Millers_Circe_as_an_Allegory_of_Womens_Struggle_during_the_Feminist_Movement.

Rawlins, W. K. (1982). Cross-sex friendship and the communicative management of sex-role expectations. *Communication Quarterly*, *30*(4), 343-352.

Saint, J. (2021). *Ariadne*. Wildfire.

Saint, J. (2022). *Elektra*. Wildfire.

Santos, H. C., Varnum, M. E., & Grossmann, I. (2017). Global increases in individualism. *Psychological science*, *28*(9), 1228-1239.

Sarwar, Rizwana, and Saadia Fatima. (2022). Madeline Miller's Circe: A Feminist Stylistic Approach. Perennial Journal of History 3.2: 337-359.

Selling, K. (2004). Fantastic Neomedievalism: The Image of the Middle Ages in Popular Fantasy. *Flashes of the Fantastic, Selected Papers from The War of the Worlds Centennial, Nineteenth International Conference on the Fantastic in the Arts*. Ed. David Ketterer, Praeger Publishers: Westport, CT, 211-218.

Vianu, L. (2006). *The Desperado Age*. Asociatia LiterNet.

Widananto, R. T. (2022). *The impact of patriarchal culture against female characters in Madeline Miller's Circe: A feminism perspective* (Doctoral dissertation, Universitas Islam Negeri Maulana Malik Ibrahim).

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ROSA MARIA VELÁZQUEZ SÁNCHEZ[1], ABEL RAMOS FLORES[2] AND SORIANO CHÁVEZ MISAEL[3]

THE ACCESSIBILITY OF TOURISM IN HERITAGE CITY CENTRES: THE CASE OF OAXACA CITY

Abstract

Soriano Chávez Misael This research analyzes the elements that allow evaluating the indicators to define accessible tourism in a tourist city in Mexico. According to the slogan of the world tourism organization 2022, "it is intended to rethink tourism from crisis to transformation". However, accessibility to tourist activities has not been addressed. With the use of accessibility indicators, the categories that allowed evaluating the accessibility of tourism in the historic center of Oaxaca, Mexico were analyzed. The results showed that this is not a touristically accessible destination, despite the fact that the city of Oaxaca has different tourist distintions.

Keywords: Accessible tourism, accessibility, heritage city

JEL Codes: Z30, Z32, Z38

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Introduction

According to the World Health Organization, currently 15% of the world population, that is, approximately 1000 million people present the so-called "different abilities" OMS (2017). In this regard, the World Tourism Organization declared in 2021 "Tourism for Inclusive Growth" UNWTO (2021). The tourism sector seeks that these millions of people can enjoy tourism on equal terms, as mentioned by the Ministry of Commerce, Industry and Tourism (MINCIT), (2019).

Accessibility in tourism has to do with infrastructure, but also with information and training for tourist services. In general, in all tourism alternatives, accessibility represents the criterion of equality for all visitors. Particularly in the tourism options that are promoted as inclusive and that are in fashion. In this regard, Mexico has stood out in the world tourism ranking both during the pandemic and in the return to activities (Tourist Environment, 2021).

In Mexico, the tourist offer stands out in the sea and on the beach, recently it has been oriented to promote cultural and gastronomic tourism destinations. In particular, the state of Oaxaca, which is located in the southeast of the country, was recognized as the "Leading Urban Getaway Destination in Mexico and Central America 2020" by the World Travel Awards (WTA). In this regard, the Oaxaca Secretary of Tourism promotes the Guelaguetza worldwide, which is a cultural festival that takes place in the summer (2021). In addition, Oaxaca is a World Heritage City (UNESCO, 2022), so it is currently an important tourist destination in which inclusion must be observed.

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When observing the statistics of visitors with disabilities to the city of Oaxaca (Secretary of Tourism of the State of Oaxaca, 2019), the proportion that visitors with disabilities represent can be observed, however, barriers can be seen in the infrastructure on the streets, museums, lodging places or places that dispatch food, the barriers, not only of infrastructure due to the traditional architectural characteristics of a historic city but also the barriers caused by the lack of information to enjoy leisure and tourist services in a situation of equality, situations that directly affect the rights proclaimed worldwide for people with disabilities.

In general, accessibility continues to be a challenge for people with disabilities. In Mexico, as noted by the National Human Rights Commission (2019), when declared that "*none of the federal entities adequately contemplates the regulations that exist regarding accessibility*." In particular, when accessibility refers to access to tourism. Due to the above and due to the rise of the city of Oaxaca as a tourist destination and the urban transformation observed as a sample in his study Rodríguez López (2017), for which reason it was considered for this investigation to analyze the area known as the historic center because it is where all visitors who travel on a tourist plan converge to analyze and evaluate the infrastructure, services, and information oriented towards accessible tourism as a research objective.

Literature Review

Trejo Lara (2019) described the Huaca Pucllana archaeological site in Peru as partially accessible for people with hearing disabilities because the space had a sign language interpreter and because there were deficiencies in the mobility of people with visual disabilities. Regarding accessibility to El Murciélago and San Mateo beaches in Ecuador, Velázquez & Zambrano (2019) found that the infrastructure for people with capacity is reduced to two ramps without signposting, they do not have special transportation and interviews with service providers did not express interest in accessible tourism.

In another, the Historic Center of Quito, Sánchez Mayorga (2014) when analyzing the infrastructure found that "the tourist site does not have the optimal conditions related to accessibility issues to be able to receive people with disabilities." He also found that the tourist service providers were unaware of the way to attend to visitors with different capacities. In this regard and based on the experiences of Jerez Mesías & Cejas Martínez (2018) in the Salcedo canton, Cotopaxi province; by López Brunett & Luna Vergara (2017) and Sánchez Ruiz, Loarte Tene, & Caisachana Torres (2020) in Ecuador. Flor Tutiven (2019), included different categories within the variables and proposed an instrument to measure accessibility with a technical sheet to collect the data.

In Mexico, Guajardo Galván, García García, & Sánchez Villareal (2012), analyzed the accessibility of tourism in the Monterrey metropolitan area and found that "information on products and services accessible to visitors was scarce." The evaluation showed that the metropolitan area of the city of Monterrey was not suitable for accessible tourism. The results of the investigations of the accessibility of tourism, provide the methodology to evaluate the infrastructure, services, and information of accessible tourism and due to the characteristics of the Historic Center of the City of Oaxaca de Juárez, we propose to test the tourist accessibility for visitors with motor, visual and hearing disabilities.

Methodology

For this qualitative research, the methodology proposed by Flor Tutiven (2019) was resumed and the context of the Historic Center of the city of Oaxaca was considered. To evaluate the accessibility of tourism, data were collected with direct observation of the physical environment. The data was collected in the streets that make up the historic center of the city of Oaxaca. A technical sheet was used as an instrument for data collection. The Accessibility of Tourism was evaluated with 10 categories and 18

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indicators see Table 1. The categories Pedestrian circulation, Pedestrian crossing, Traffic lights, Access, Cleaning, Information and communication, Accessible circuits, Signage, Tactile bands, and special parking. Category analysis was carried out using the Atlas.ti program and with the results, a questionnaire was designed that was applied to 65 tourists with disabilities.

Table 1. Category and Indicator of Tourism Accessibility

Category	**Indicator**
1. Pedestrian circulation	Displacement Ground situation Space to walk Room to scroll Hall space and height Corridor space and height Solutions and alternatives
2. Crosswalk	Alignment
3. Traffic light	Acoustic sound Visual signaling Acoustic signaling
4. Access	Connection of streets with squares
5. Toilet	Spaces for toilet
6. Information and communication	Special information
7. Accessible tourist circuits	Designated circuits Personalized attention
8. Signage	Visual signals Audible signals
9. Tactile bands	Frequency
10. Parking specials	Exclusive spaces

Source: Authors. Own elaboration based on the categories of Flor Tutiven (2019).

Results and Conclusions

The results of the indicators evaluation from the 10 categories of tourism accessibility showed the following:

Pedestrian Circulation Category

Indicator *Displacement:* Only 5 streets of the Historic Center had flat ground for the easy movement of people with disabilities. The 12 did not comply because they had very small sidewalk spaces, spaces with lamps, street stalls, bicycles, and/or motorcycles parked on the sidewalks. Indicator: *Ground situation* only 6 streets have firm and stable ground. 6 streets did not comply because they have severe wear from the quarry and flying buttresses in poor condition. Indicator *Space to walk:* 5 streets with very little space, no space for wheelchairs, and other different capacities. Tree roots, street stalls, business propaganda. There are no accessible alternatives on any of the streets. There are no actions to avoid uneven sidewalks. Placement of awnings, plaques, posters, and signage in pedestrian areas.

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Categories Pedestrian crossing, Traffic lights and Signaling

At the pedestrian crossing, 12 streets have a ramp in good condition with space and alignment. Traffic lights with sound for the visually impaired only at 3 street crossings. Only 3 streets with a traffic light with a visual signal for the hearing impaired. A current problem is the removal of traffic lights for 1 x 1 traffic, a decision that limits the safe transit of people with disabilities. In the 12 streets evaluated, there is no audible or tactile signage, and there is no signage in Braille.

Categories Access, Information and Communication

Access to the main streets of the Historic Center of the City of Oaxaca does not present conditions for people with disabilities. The vehicles do not have facilities for mobility and access for people with disabilities. The official tourist modules, do not provide information, formats, alternatives, or services for visitors with both visual and hearing disabilities.

Categories Accessible Circuits, Parking and Toilet.

Most travel agencies do not handle accessible circuits. Travel agencies do have certified guides, but these guides do not have training on accessibility issues and the management of groups of people with disabilities. Of the 25 spaces allocated for parking in the studied area, there is only 1 exclusive space for vehicles of people with disabilities and to occupy it they must process a card. The establishments that offer sanitary services do not have accessibility criteria.

Factorial Analysis of the Results

With the indicators, and results of the qualitative analysis, the questionnaire was designed and applied to a random sample of 65 tourists with disparity. Through factorial analysis of principal components and with varimax rotation, the validity test of the questionnaire was carried out. It was observed that, of the 16 items included, they were grouped into three components, which are identified by aspects related to the infrastructure for accessible tourism in component one, in component two aspects of tourism services and personnel are appreciated, and in component two component three mainly grouped those related to signaling and specific aspects of infrastructure.

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Table 2. Principal Components Analysis Matrix

	Component		
Access	-.183	-.075	.654
Exclusive spaces	.122	.471	.549
Special information	-.137	.763	-.273
Personalized attention	.327	.623	-.269
Designated circuits	.338	-.613	-.022
Signage	.309	.217	.670
Spaces for toilet	.859	-.194	.049
Room to scroll	.958	.031	-.049
Solutions and alternatives	.750	.241	.021
Parking specials	.788	-.095	-.136

Source: Authors. Own elaboration with data from the survey and with the use of the program SPSS.21.
Extraction Method: Principal component analysis to 3 extracted components.

As can be seen, because it is an exploratory study, the results of the factor analysis provide guidelines for a review of the questionnaire for its application in a larger sample; however, the results allow an approach to the analysis of the perception of tourists with disability before the services and infrastructure present in the table evaluated for this study in the historic center of Oaxaca.

Table 3. Component transformation matrix

Component	1	2	3
1	.995	-.029	.093
2	.000	.952	.305
3	-.097	-.303	.948

Source: Authors.
Extraction Method: Principal component analysis. Rotation method.
Método de rotación: Standardization Varimax with Kaiser.

Conclusions and Limitations

The results of this investigation allow us to conclude that the historic center of the City of Oaxaca de Juárez is not prepared to receive visitors with disabilities, which refers to to offering *accessible tourism*. Specifically, it was obtained as a result of the evaluation that the infrastructure, services and information of the place show poor accessibility for visitors with different abilities. The observed results allowed us to prove that: "The current conditions of the infrastructure, services and information of the Historic Center of the City of Oaxaca de Juárez do not meet tourist accessibility criteria for visitors with motor, visual and hearing disabilities".

This study contributes to the existing knowledge in the state of the art of accessible tourism from the visualization of accessible tourism indicators and the characterization of accessibility categories. They also contribute to the evaluation of tourist accessibility conditions in cities designated World Heritage Sites by UNESCO. The results allow us to visualize a set of topics for new research in other types of tourist destinations such as the archaeological zones of Monte Albán and Mitla.

Note: The authors are professors of the Faculty of Accounting and Administration of the Autonomous University "Benito Juárez" of Oaxaca, Mexico

References

Clemente Soler, J. A., Bote Díaz, M., & Sánchez Vera, P. (2018). Accessible social tourism as a new tourism model. *Cuadernos de Turismo*(41), 139-159. Recoveredel 19 de Mayo de 2021, de https://revistas.um.es/turismo/article/view/326981/228751.

Comisión Nacional de los Derechos Humanos [CDND]. (2019). *Special Report on the Right to Accessibility of Persons with Disabilities.* Recovered 02 de Mayo de 2021, de https://www.cndh.org.mx/sites/default/files/documentos/2019-08/IE-Accesibilidad.pdf.

Entorno Turístico. (21 de octubre de 2021). *Tourist Environment, let's talk about tourism*. Recovered de https://www.entornoturistico.com/.

Flor Tutiven, A. d. (2019). Study of accessible tourism in the historical complex of Quayaquil case; Barrio las peñas. Degree Thesis. Universidad de Guayaquil, Guayaquil, Ecuador. Recovered 06 de Abril de 2021, de http://repositorio.ug.edu.ec/bitstream/redug/34856/1/tesis%20final%20final.pdf.

Guajardo Galván, F., García García, A. L., & Sánchez Villareal, I. (2012). Evaluation of the accessibility of the tourism industry of Monterrey: A first step towards accessible tourism. Degree Thesis. Universidad de Monterry, Monterrey, México. Recovered 05 de Abril de 2021, de http://bibsrv.udem.edu.mx:8080/e-books/Tesis/000144602_LTU.pdf.

Jerez Mesías, K. P., & Cejas Martínez, M. F. (2018). *Analysis of accessible tourism as a strategy of social inclusion for people with disabilities in the Salcedo canton, Cotopaxi province.* Latacunga,

Ecuador: Universidad de las Fuerzas Armadas ESPE Extensión Latacunga. Recovered 21 de Mayo de 2021, de http://repositorio.espe.edu.ec/xmlui/bitstream/handle/21000/15386/AC-ESPEL-ITH-0096.pdf?sequence=1&isAllowed=y.

López Brunett , A. L., & Luna Vergara, H. Z. (2017). Accessible tourism in Ecuador. *INNOVA Research Journal, 2*(7), 196-198. Recuperado el 16 de Mayo de 2021, de https://repositorio.uide.edu.ec/bitstream/37000/3652/3/document.pdf.

Ministerio de Comercio, Industria y Turismo (MINCIT). (2019). *Accessible Tourism Manual "Tourism for all "* (first ed.). Bogotá, Colombia. Recovered 01 de Mayo de 2021, de http://turismo.huila.gov.co/storage/app/uploads/public/5ce/556/330/5ce556330b26f216169482.pdf.

Organización Mundial de la Salud [OMS]. (Noviembre de 2017). Recovered 01 de Mayo de 2021, de https://www.who.int/features/factfiles/disability/es/#:~:text=Dato%201%3A%20m%C3%A1s%20de%201000,tienen%20grandes%20dificultades%20para%20funcionar.

Organización Mundial del Turismo [OMT]. (2014). *Manual on Accessible Tourism for All: Principles, tools and good practices.* Madrid. España: Organización Mundial del Turismo [OMT]. Recuperado el 29 de Julio de 2021, de https://www.e-unwto.org/doi/pdf/10.18111/9789284416486.

Organización Mundial del Turismo [OMT]. (2019). *Definitions of tourism OMT.* Madrid : OMT. Recovered 13 de Diciembre de 2021, de https://www.e-unwto.org/doi/pdf/10.18111/9789284420858.

Organización Mundial del Turismo [OMT]. (2021). *Glossary of tourism terms*. Recovered Diciembre de 2021, de OMT : https://www.unwto.org/es/glosario-terminos-turisticos.

Rodríguez López, Y. (2017). The urban transformation from the patrimonial declaration: the Historical Center of Oaxaca de Juárez. Barcelona-Bogotá: Departament d'Urbanisme i Ordenació del Territori. Universitat Politècnica de Catalunya. Recuperado el 22 de Mayo de 2021, de https://upcommons.upc.edu/bitstream/handle/2117/108544/62BGT_RodriguezYadira.pdf?sequence=1&isAllowed=y.

Sánchez Mayorga, J. M. (2014). Analysis of the current situation of accessible tourism for people with disabilities in the historic center of the city of Quito as a tourist destination. Degree Thesis. Universidad Tecnológica Equinoccional, Quito, Ecuador. Recuperado el 05 de Abril de 2021, de http://192.188.51.77/bitstream/123456789/13502/1/58182_1.pdf.

Sánchez Ruiz, J., Loarte Tene, M., & Caisachana Torres, D. (2020). Accessible and inclusive tourism in Ecuador, compared to accessible tourism in other countries. *Universidad y Sociedad,* 225-231. Recuperado el 01 de Mayo de 2021, de http://scielo.sld.cu/pdf/rus/v12n1/2218-3620-rus-12-01-225.pdf. Secretaría de Turismo [SECTUR]. (2021). *Datutur*. Recovered 04 de Agosto de 2021, de http://www.datatur.sectur.gob.mx/SitePages/Glosario.aspx.

Secretaría de Turismo del estado de Oaxaca. (diciembre de 2021). *Gobierno del Estado de Oaxaca*. Obtenido de https://oaxaca.gob.mx.

Trejo Lara, V. A. (2019). Diagnosis of accessible tourism in Huaca Pucllana for tourists with disabilities in the district of Miraflores 2019. Degree Thesis.. Universidad César Vallejo, Lima, Perú. Recovered 06 de Abril de 2021, de https://repositorio.ucv.edu.pe/bitstream/handle/20.500.12692/46596/Trejo_LVA-SD.pdf?sequence=1&isAllowed=y.

UNESCO. (17 de marzo de 2022). *World Heritage Convention*. Recovered de https://whc.unesco.org/es/list/415.

Velásquez, Z. F., & Zembrano, P. E. (2019). Evaluación del mercado turístico proyectándose hacia un turismo accesible en el destino Manta/Manabí. *Tesis de Maestría.* Escuela Superior Politécnica Agropecuaria de Manabí Manuel Felix López, Manta, Ecuador. Recuperado el 05 de Abril de 2021, de http://190.15.136.145/bitstream/42000/1046/1/TTMT9.pdf.

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ABIMBOLA OLUYEMISI ADEPOJU[1] AND ADETUNJI ADELEKE[2]

MULTIDIMENSIONAL HOUSEHOLD ENERGY POVERTY IN RURAL NIGERIA

Abstract

The multidimensional energy poverty of rural Nigerian households was examined. The Multidimensional Energy Poverty Index (MEPI) was utilised to classify households into various energy poverty categories. Ordered logistic regression was employed to determine the factors influencing energy poverty, while multinomial logistic regression was used to assess the factors influencing energy poverty transitions. With a MEPI of 0.662, a headcount of 0.985, and an intensity of 0.668, rural households in Nigeria showed moderate levels of energy poverty. The gender and level of education, housing infrastructures, and asset value played significant roles in the multidimensional energy poverty status of rural households. Consequently, the government and other stakeholders should prioritise the formulation and adoption of diverse policies regarding the underlying factors of energy poverty. The development of human resources through a greater understanding of cleaner energy sources should also be a primary focus of development interventions. As a result of the multidimensional nature of energy deprivation, its factors and transitions may alter over time. Energy policies could be designed to target households at various levels of energy poverty. Priority should be placed on conducting additional research on appropriate intervention measures to reduce energy poverty.

Keywords: Multidimensional Energy Poverty Index, chronic energy poverty, transient energy poverty, clean energy, rural

JEL Codes: C42, I31, O13, Q40

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Introduction

Energy is closely linked to power, force, or fuels. It can be defined as anything that can be utilised to produce work and is essential to daily life and activities for humans (Edoumiekumo, Tombofa & Karimo 2013; Ogunniyi, Adepoju & Olapade-Ogunwole, 2012). Energy thus plays a vital role in every society because it transcends every facet of human life, promotes economic expansion, greater social fairness, and the creation of a striving and thriving environment (United Nations, 2014). More significantly, socio-economic independence and progress depend greatly on the availability and affordability of modern, clean energy services. In reality, the availability of energy from a clean, efficient source for home and industrial use is essential for a nation's prosperity in today's industrialised world. This is because it is a requirement for economic development and liberation (Huang, 2021; Ashagidigbi et al., 2020). It is commonly acknowledged that virtually every aspect of human life, including agriculture, industry, health, water, communication, and education, relies on electricity (Bazilian et al., 2010). However, despite its significance for sustaining life and the economy, particularly in Africa, alarmingly low levels of access to electricity and other sources of renewable energy have brought to the fore the notion of the energy poor (Sokona, Mulugetta & Gujba, 2012; IEA, 2010).

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For instance, a household is considered energy poor when its members are unable to cook with clean fuels and are unable to study or perform other productive tasks in the dark (Gaye, 2008). The Asian Development Bank defined energy poverty generally as the incapability to acquire dependable, cost-effective, and eco-friendly energy services to promote personal, economic, and commercial growth (Masud, Sharan & Lohani, 2007). Therefore, in poor nations, a lack of access to electricity or an inability to pay for it when it is available causes an exclusive reliance on conventional fuels like firewood, constituting "energy poverty" (IEA, 2010; Sovacool, 2012). The problem of energy poverty is getting worse, especially for people with modest incomes in emerging countries (Pachauri & Spreng, 2004). The bulk of those without access is found in South Asia and sub-Saharan Africa, making up about 25% of the global population (Orji et al., 2020).

Notably, the majority of those living in these locations without electricity could only afford to do so in the rural parts of these developing countries (Ohiare, 2015). For instance, Nigeria dubbed the "giant of Africa," has undoubtedly always struggled with a lack of modern electricity infrastructure. In fact, between 2004 and 2010, over 70% of her population cooked using firewood (National Bureau of Statistics, 2010). This statistic shows a significant amount of energy poverty in the nation, which has serious implications for sustainable development. In addition, due to price fluctuations of kerosene, a common cooking fuel across geopolitical zones in recent times, energy poverty has been exacerbated. Thus forcing households to find and use less expensive alternatives that not only have negative environmental effects but also lead to several health problems (Orji et al., 2020; Ashagidigbi et al., 2020).

Consequently, electricity being readily available is seen as a crucial step toward the elimination or reduction of energy poverty in this region (IEA, 2010; Nussbaumer, Bazilian & Modi, 2012; Agu & Orji, 2015; Orji et al., 2021). Given that a household may not be vulnerable to other indices of healthy living besides energy, the rise in energy-poor households will be especially concerning. This explains why taking a multidimensional approach to household energy status is essential. Therefore, a comprehensive examination of the concept of energy poverty and subsequent intervention in the impacted communities, regions, or zones ought to take precedence in policy discourse. This necessitates a study of the level of multidimensional energy poverty in rural households and its contributing factors.

The concept of multidimensional energy poverty (MEP) was adopted from the literature on multidimensional measures of poverty (Alkire, 2007; Alkire & Foster, 2011a; Alkire & Santos, 2012; Alkire & Foster, 2011b). Fundamentally, the MEP considers the many sets of energy deprivation with diverse indicators that can influence the standard of living in a household. The multidimensional energy poverty index (MEPI) was constructed employing these characteristics and indicators to establish whether or not a household is energy poor. A household is energy poor if the weighted aggregate of its deprivations (i.e. index) surpasses a predefined threshold. Compared to other energy poverty measuring tools, The MEPI places its primary emphasis on the energy services that are ultimately required by households for their day-to-day activities. The MEPI also accounts for the many dimensions of energy poverty, which extend further than headcount and include its severity. Thus, MEPI transcends the oversimplification that other metrics adapt by assuming a binary state. Finally, MEPI's flexibility ensures its suitability for several analyses.

The research contributes to the existing literature in two ways: Although there are many empirical studies on poverty in the literature (Onu & Abayomi, 2009; Obayelu & Awoyemi, 2010; Adeyonu et al., 2012; Olawuyi, 2013; Agu and Orji, 2015; Mba et al., 2018; Orji et al., 2020), there haven't been many efforts made specifically at the national level to address multidimensional forms of energy deprivation (Apere and Karimo, 2014; Bersisa, 2016; Ashagidigbi et al., 2020). Additionally, earlier research that attempted to advance information on energy poverty (Edoumiekumo, Tombofa, and Karimo 2013; Ehinmowo, Ufondu & Aliyu, 2018) were constrained by the fact that they only examined

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specific regions of the nation. Therefore, by describing the situation of energy poverty across all of Nigeria's geopolitical zones, this study contributes to filling this gap in the literature. Additionally, while the majority of the existent literature (Edoumiekumo et al., 2013; Apere & Karimo, 2014) only employed three indicators in their analysis of the MEPI of households, this study utilised six indicators, thus allowing room for a robust analysis.

To the best of our knowledge, none of the articles on energy poverty that were reviewed addressed the problem of multidimensional energy poverty transitions and their causes. Evidence from related literature, however, suggests that poverty is not static (Mba, Nwosu & Orji, 2018; Adepoju, 2012) and that factors driving poverty and its transitions may change over time. As a result, this study also contributes to knowledge on energy poverty by taking into account two time periods and exploring the factors influencing multidimensional energy poverty transitions. It also gives guidance on which intervention policies would be suitable and can be focused on for an appreciable impact on energy poverty reduction.

Therefore, due to the paucity of empirical studies on multidimensional energy poverty, as the focus of the majority of existing studies on poverty has been on income poverty (Babatunde, Olorunsanya & Adejola, 2008; Akerele & Adewuyi, 2011; Ogwumike & Akinnibosun, 2013; Olawuyi, 2013; Adeyonu et al., 2012), it is pertinent that further research is conducted. Additionally, the few research (Edoumiekumo, Tombofa & Karimo, 2013; Moyib, Ojo & Ayodele, 2017; Ehinmowo, Ufondu & Aliyu, 2018) on energy poverty have not addressed the topic of multidimensional energy poverty transitions and the factors that influence it. Therefore, the purpose of this study is to fill in the gaps in the literature by attempting to address the following research questions: Which households in rural Nigeria can be categorised as energy poor? What factors influence the energy poverty status of rural households in Nigeria? Do households in rural Nigeria experience energy poverty intermittently? What factors influence multidimensional energy poverty transitions in rural Nigeria?

The remaining sections of this paper are organised as follows: The scope of the study, sample and data collection methods, datasets with variables and indicators, and data analysis techniques are all covered in Section 2. The results and discussion of the findings are reported in Section 3. Section 4 concludes with a summary of the key findings, recommendations, and policy implications of the findings.

Materials and Methods

Scope of the Study

The scope of the study is rural Nigeria. Nigeria is located on the Gulf of Guinea in West Africa. Its total land area is 923,768 km2 and it lies between latitudes 4° and 14°N and longitudes 2° and 15E. It is the thirty-second largest country in the world. It shares 773 kilometres with Benin in the west, 1497 kilometres with Niger in the north, 87 kilometres with Chad and 1690 kilometres with Cameroon in the east, and a coastline of at least 853 kilometres along the Atlantic Ocean in the south. It is composed of 36 states and the Federal Capital Territory and is separated into six geopolitical zones. Almost 70% of the population is engaged in agriculture, making the country primarily agricultural.

Sample Selection and Data Collection

This study utilised the General Household Survey (GHS) panel data. The households evaluated in the study were selected using a two-stage probability sampling process. Using probability proportional to size, Primary Sampling Units (PSUs) were identified in the first stage. Using this procedure, a total of 500 PSUs from each state and the Federal Capital Territory (FCT) were selected. The second step involved the systematic selection of ten households per PSU. 500 PSUs were canvassed, and 5,000

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households, including 3,370 rural households and 1,630 urban households, were interviewed. However, only 2,287 households with complete and relevant data comprised this study's sample size. STATA 14 was used for data analysis.

Analytical Techniques

Multidimensional energy poverty index (MEPI):
To profile the socioeconomic characteristics of the respondents, descriptive statistics were employed. The energy poverty status of each household was estimated using the MEPI following Nussbaumer et al. (2012). MEP and MEP transitions' determination were analysed using ordered and multinomial logistic regression, respectively. For this study, contemporary cooking fuel, indoor pollution, energy access, household appliance, entertainment/education appliance ownership, and telecommunication means were used as proxies to depict energy services as stated in Table 1 (Bersisa 2016; Ehinmowo, Ufondu, and Aliyu 2018; Ozughalu and Ogwumike 2019).

In accordance with the research of Edoumiekumo et al. (2013), the MEP cut-off value k of 0.5 was used. Hence, if a household's weighted deprivation total is less than 0.5, it is not energy poor. On the other hand, moderately energy-poor households experience weighted deprivation that is larger than 0.5 but less than 0.8. A household's total weighted deprivation must be more than or equal to 0.8 to qualify as acutely energy-poor. The dimensions, indicators, variables, and cut-off points utilised to create the MEPI for the study are displayed in Table 1.

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Table 1. Dimensions, Indicators and Variables with Cut-offs for Constructing the MEPI

Dimension	Indicator (Weight in parenthesis)	Variable	Cut-off (Household is poor if …)
Cooking	Modern cooking fuel (0.4)	Type of cooking fuel	household uses any fuel in cooking besides electricity, LPG, natural gas or biogas
Lighting	Electricity access (0.2)	Has access to electricity	the household does not have access to electricity for lighting and other purposes
Service from Appliances	Ownership of household appliance (0.13)	Has a/an electric stove, fan, fridge, freezer, air conditioner, electric iron, microwave, washing machine	the household does not enjoy service from at least four of these household assets
Entertainment/Education	Ownership of entertainment/education appliance (0.13)	Has a radio or television	the household does not have at least one of the two
Communication	Telecommunication means (0.13)	Has a mobile phone or GSM	the household does not have at least one

Source: Authors' Computation.

$$A = \sum_{i=1}^{n} \frac{c_i(k)}{q} \quad (1)$$

$$H = \frac{q}{n} \quad (2)$$

$$MEPI = H * A \quad (3)$$

Where: A represents energy poverty intensity, H is the energy poverty headcount, q is energy poor household, n is the total population, and C_i is the energy poverty index for each household reflecting their deprivations.

Ordered logit model:

Ordered logistic regression was used to obtain the factors influencing the multidimensional energy poverty of rural households in Nigeria. The model is expressed as:

$$ln\left[\frac{Y_{ij}}{1-Y_{ij}}\right] = \beta_{0j} - (\beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n) \quad (4)$$

The variable definition in the ordered logit model is as follows:

Y_{ij} =1 represents energy non-poor, the lowest ordered category

$Y_{ij} \leq 2$ represents moderately energy poor, the lowest two ordered categories

$Y_{ij} \leq 3$ represents acutely energy poor, the lowest three ordered categories

X_1 represents the household head's Age (Years)
X_2 represents the household size (Number)
X_3 represents the household head's gender (Male = 1, Female=0)
X_4 represents the household head's primary occupation (Farmer =1, Otherwise=0)
X_5 represents the household head's marital status (Married = 1, Otherwise=0)
X_6 represents the household head with no formal education (None =1, Otherwise=0)
X_7 represents the household head with primary education (Primary = 1, Otherwise=0)
X_8 represents the household head with secondary education (Secondary=1, Otherwise=0)
X_9 represents the household house ownership status (Yes = 1, Otherwise=0)
X_{10} represents remittances (Yes = 1, Otherwise=0)
X_{11} represents credit access (Yes = 1, Otherwise=0)
X_{12} represents roof materials (Iron sheets = 1, Otherwise=0)
X_{13} represents wall materials (Mud = 1, Otherwise=0)
X_{14} represents floor materials (Sand = 1, Otherwise=0)
X_{15} represents toilet facility (None =1, Otherwise=0)
X_{16} represents assets value (Naira)
X_{17} represents the distance to the nearest road (Kilometres)
X_{18} represents the distance to market (Kilometres)
X_{19} represents North-Central (North-Central = 1, Otherwise=0)
X_{20} represents North-East (North-East = 1, Otherwise=0)
X_{21} represents North-West (North-West = 1, Otherwise=0)
X_{22} represents South-East (South-East = 1, Otherwise=0)
X_{23} represents South-South (South-South = 1, Otherwise=0)
ε_i represents the Stochastic error term

Markov matrix model:

Markov matrix model was used to investigate and examine multidimensional energy poverty transitions of households between wave 2 and wave 3 to ascertain the movement of households in and out of energy poverty over the defined period. The Spell approach was adopted to operationalise the concept of chronic and transient poverty. A poor household in only one period is classified as being transiently energy poor (entering and exiting energy poverty). In contrast, a household that is energy poor in both periods is chronically energy poor.

Multinomial regression model:

In order to investigate the factors that influence energy poverty transitions, a multinomial regression model was used. The model was employed because of its suitability in capturing the various degree of energy poverty among the energy-poor households following Adepoju (2012). Multinomial logistic regression is primarily suitable for a nominal dependent variable that is not ordered but with more than two categories. The dependent variable in this study has four categories which are: always energy-poor (AEP), exiting energy poverty (EXEP), entering energy poverty (ENEP) and always energy non-poor (AENP). Three linear equations were estimated relative to the base category (always energy non-poor) in estimating a multinomial logit with four categories. The equations are explicitly stated as follows:

$$ln\left[\frac{Pr(Y=AEP)|X}{Pr(Y=AENP)|X}\right] = \beta_0^{AEP} + \beta_1^{AEP}X \quad (5)$$

$$ln\left[\frac{Pr(Y=EXEP)|X}{Pr(Y=AENP)|X}\right] = \beta_0^{EXEP} + \beta_1^{EXEP}X \quad (6)$$

$$ln\left[\frac{Pr(Y=ENEP)|X}{Pr(Y=AENP)|X}\right] = \beta_0^{ENEP} + \beta_1^{ENEP}X \quad (7)$$

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Where;
X_1 represents the Age of household head (Years)
X_2 represents household size (Number)
X_3 represents gender of the household head (Male = 1, Female=0)
X_4 represents primary occupation of the household head (Farmer =1, Otherwise=0)
X_5 represents the household head's marital status (Married = 1, Otherwise=0)
X_6 represents the household head with no formal education (None =1, Otherwise=0)
X_7 represents primary education of household head (Primary = 1, Otherwise=0)
X_8 represents secondary education of the household head (Secondary=1, Otherwise=0)
X_9 represents house ownership status (Yes = 1, Otherwise=0)
X_{10} represents remittances (Yes = 1, Otherwise=0)
X_{11} represents credit access (Yes = 1, Otherwise=0)
X_{12} represents roof materials (Iron sheets = 1, Otherwise=0)
X_{13} represents wall materials (Mud = 1, Otherwise=0)
X_{14} represents floor materials (Sand = 1, Otherwise=0)
X_{15} represents toilet facility (None =1, Otherwise=0)
X_{16} represents assets value (Naira)
X_{17} represents the distance to the nearest road (Kilometres)
X_{18} represents the distance to market (Kilometres)
X_{29} represents Regional dummy (North-Central = 1, Otherwise=0)
X_{20} represents Regional dummy (North-East = 1, Otherwise=0)
X_{21} represents Regional dummy (North-West = 1, Otherwise=0)
X_{22} represents Regional dummy (South-East = 1, Otherwise=0)
X_{23} represents Regional dummy (South-South = 1, Otherwise=0)
ε_i represents the Stochastic error term

Results and Discussion

Socioeconomic Characteristics of Respondents

Table 2 provides information about the respondents' socioeconomic characteristics. The average age of household heads was 54 years, and 68.3% of them were between the ages of 40 and 69. This reflects that household heads who are in their productive years are predominant in the study area. Also, more than four-fifths of the respondents were married. This result is similar to the findings of Ashagidigbi et al. (2020), Bersisa (2016), and Omotesho and Muhammad-Lawal (2010). Furthermore, the majority of household heads have primary education. This could be ascribed to farming being the prevalent livelihood in the study area, which requires little or no formal education. This finding corroborates the findings of Adepoju (2012), who indicated that the majority of rural family heads had only completed primary school. In addition, about four-fifths of respondents as shown in Table II were engaged in farming as their primary occupation, demonstrating the reliance of rural households in Nigeria on agriculture for their livelihoods and sustenance. In addition, the average size of the respondents' households was eight individuals. This strongly suggests a labour force that is active and positively promotes agricultural activity. This finding supports the results obtained by Okoedo-Okojie and Onemolease (2009). Male-headed households were predominant in the research area and were responsible for arduous agricultural tasks such as land preparation, whilst females frequently undertook complementary responsibilities such as crop processing.

About four-fifths (80.2%) of rural households lacked access to credit facilities. This is likely due to the high percentage of financial illiteracy in Nigeria's rural communities (Matewos, Navkiranjit, & Jasmindeep, 2016). In addition, almost all (96.9%) of the respondents lack access to remittances, which may have provided extra revenue for households. A substantial proportion (67.0%) of rural households

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have access to electricity; however, about half of the respondents rely heavily on dry cells (torch) for lighting purposes. This demonstrates the incapacity of rural households to utilise or benefit from electricity despite having access to it. As seen in Table 2, firewood is the principal source of cooking fuel for the majority of rural families in Nigeria. Consequently, respondents are exposed to the health risks associated with inhaling smoke generated from the use of firewood. This result is comparable to those of Ozughalu & Ogwumike (2019) and Bersisa (2019). They observed that more than three-fifths of households depend on firewood for food preparation, confirming the prevalence of energy poverty among rural households.

Table 2a. Socioeconomic Characteristics of Respondents (following in next page: Table 2b)

Variable	Frequency	Percentage (%)
Age		
< 40	382	16.7
40-69	1563	68.3
70-99	338	14.8
≥ 100	4	0.2
Marital Status		
Married	1954	85.4
Separated	46	2.0
Widowed	266	11.6
Never married	21	0.9
Educational Level		
No formal education	359	15.7
Primary education	1440	63.0
Secondary education	276	12.1
Tertiary education	212	9.3
Household Size		
< 5	369	16.1
5-9	1259	55.1
10-above	659	28.8
Primary Occupation		
Farming	1861	81.4
Non-farming	426	18.6
Gender		
Male	2044	89.4
Female	243	10.6
House Ownership Status		
Owned	2047	89.5
Free, authorized	173	7.6
Free, not authorized	13	0.6
Rented	54	2.4
Credit Access		
Yes	453	19.8
No	1834	80.2
Electricity Access		
Yes	1533	67.0
No	754	33.0
Access to Remittances		
Yes	71	3.1
No	2216	96.9

Source: Authors' Computation.

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Table 2b. Socioeconomic characteristics of respondents

Variable	Frequency	Percentage (%)
Lighting Fuel		
Firewood	203	8.9
Grass	2	1.0
Kerosene	488	21.3
Electricity	459	20.1
Generator	92	4.0
Dry cell (Torch)	1031	45.1
Candles	12	0.5
Cooking Fuel		
Firewood	2157	94.3
Charcoal	6	0.3
Grass	6	0.3
Kerosene	92	4.0
Electricity	5	0.2
Generator	4	0.2
Gas	17	0.7
Geopolitical Zone		
North-Central	428	18.7
North-East	414	18.1
North-West	614	26.9
South-East	409	17.9
South-South	298	13.0
South-West	124	5.4
Total	2287	100.0

Source: Authors' Computation.

Rural Households' Multidimensional Energy Poverty Indices

Table 3 reveals that almost all rural households are energy poor and have been deprived in at least 67% of weighted indicators. MEPI's adjusted headcount ratio of 66.0% indicates moderate energy poverty in rural Nigeria. This corroborates the findings of Apere & Karimo (2014), in which energy deprivation was moderate in rural Nigeria but severe in urban areas. South-South and South-East have the greatest MEPI (69.0%) and energy poverty intensity scores (71.0% and 70.0%, respectively) when disaggregated by region. The South-West area had the highest energy poverty headcount at 100 percent, showing that all rural households in the area are deficient in at least 50 percent of the weighted categories. This result is comparable to that of Ehinmowo et al. (2018), who stated that southern Nigerian zones are somewhat energy deficient. In contrast, the North-East has the lowest MEPI and intensity at 64.0%.

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Table 3. Multidimensional household energy poverty indices by geopolitical zones

Zones	Headcount	Intensity	MEPI	Degree of Energy Poverty
Rural Nigeria	0.9895	0.6686	0.6616	Moderate
North-Central	0.9813	0.6590	0.6466	Moderate
North-East	0.9952	0.6437	0.6406	Moderate
North-West	0.9951	0.6585	0.6553	Moderate
South-East	0.9902	0.6995	0.6926	Moderate
South-South	0.9765	0.7069	0.6903	Moderate
South-West	1.0000	0.6409	0.6409	Moderate

Source: Authors' Computation.

Factors Influencing Rural Households' Multidimensional Energy Poverty

Table 4 displays the marginal effects of the ordered logistic regression variables. The findings of the diagnostic test point to the fact that the model fits the data effectively. In particular, the findings demonstrated that a lack of formal education, primary education, flooring materials, and residence in the South-South zone of Nigeria positively affected the multidimensional energy poverty of rural households. In contrast, gender, roofing materials, asset value, and distance to the nearest market had negative effects. Higher levels of education incline households to earn higher wages relative to their counterparts and to make informed decisions regarding energy consumption. Hence, heads of households who have only an elementary education or none at all have a greater likelihood of having insufficient access to electricity. In particular, the likelihood of living in an acutely energy-poor household rose by 5.0% and 7.3%, respectively, for household heads with elementary education or none at all. This agrees with the findings of Edoumiekumo et al. (2013), in which educated heads of households were less probable to be in extreme energy poverty. In addition, households with sand, dirt, or straw floors, indicative of traditional living conditions, were more likely to have insufficient access to electricity. As such, a change in the flooring material improves the likelihood of being energy-efficient by 0.3% and fairly energy-efficient by 2.2%, respectively. It decreased the likelihood of an acute energy deficiency by 2.5%.

In addition, living in the South-South geopolitical zone increased the likelihood of acute energy poverty by 8.2%. However, on the other hand, it reduced the probability of being energy-non-poor and moderately energy poor by 0.4% and 7.8%, respectively. This is consistent with the findings of Ozughalu & Ogwumike's (2019) observation in which households residing in the South-South geopolitical zone had the highest prevalence of extreme energy deprivations. Negatively significant, the gender of the household head variable indicates that male-headed households are less likely to be in the upper category of energy poverty status. Thus, the risk of being acutely energy-poor fell by 4.6% for male-headed households and is projected to increase by 4.6% for moderately energy-poor households. This finding is again supported by the findings of Ozughalu & Ogwumike (2019) of an inverse association between the gender of the household head and extreme energy poverty. Furthermore, the roofing material variable which was used as a proxy for dwelling condition was negatively significant. This implies that households with iron sheets used as their roofing material are likely to fall into a lower category of energy poverty, indicating better living conditions. Thus, a change in roofing materials is projected to result in a 3.6% decrease among households with extreme energy poverty. The closer a household was to the nearest market, the more likely it was to fall into the lowest energy poverty group. A change of one kilometre in the distance travelled to the market from the household will result in a 0.5% decrease in households' acute energy poverty.

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Table 4. Determinants of multidimensional energy poverty status of rural households

Variable	Energy non-poor	Moderately energy-poor	Acutely energy-poor	Coefficient	Z-value
Age	0.0000	0.0003	-0.0003	-0.0049	-0.86
Household size	0.0000	0.0005	-0.0006	-0.0093	-0.39
Gender	0.0030*	0.0431*	-0.0461*	-0.6270	-1.73
Primary occupation	-0.0004	-0.0032	0.0035	0.6110	0.30
Marital Status	-0.0012	-0.0095	0.0107	0.1935	0.56
No formal education	-0.0041**	-0.0684**	0.0725**	0.9225	2.35
Primary education	-0.0063**	-0.0433**	0.0496	0.9141	2.55
Secondary education	-0.0025	-0.0321	0.0346	0.4963	1.24
House ownership	0.0021	0.0257	-0.0277	-0.4080	-1.81
Remittances	0.0057	0.0250	-0.0307	-0.6845	-1.46
Credit access	-0.0019	-0.0210	0.0229	0.3539	1.98
Roof materials	0.0053***	0.0308***	-0.0361***	-0.7230	-2.86
Wall materials	0.0011	0.0099	-0.0109	-0.1848	-1.00
Floor materials	0.0027**	0.0224**	-0.0251**	-0.4340	-2.27
Toilet facilities	0.0000	0.0005	-0.0005	-0.0086	-0.05
Assets value	1.47e-08***	1.31e-07***	-1.46e-07***	-2.48e-06	-5.79
Distance to nearest road	0.0000	-0.0003	0.0003	0.0052	0.51
Distance to nearest market	0.0005***	0.0004***	-0.0005***	-0.0082	-3.61
North- Central	0.0009	0.0073	-0.0082	-0.1448	-0.35
North-East	-0.0003	-0.0023	0.0026	0.4361	0.10
North-West	-0.0017	-0.0171	0.0188	0.2997	0.71
South-East	-0.0016	-0.0174	0.0191	0.2972	0.73
South-South	-0.0043**	-0.0777**	0.0820**	0.9971	2.49
Number of Obs.	2287				
LR Chi^2 (23)	158.6900				
Prob > Chi^2	0.0000				
Pseudo R^2	0.1001				
Log-likelihood	-713.5409				

Source: Author's Computation *** Significant at 1%, ** at 5%, and * at 10%.

Energy Poverty Transitions

As presented in Table 5, between waves 2 and 3, 1.4% and 0.1% of the non-energy-poor households moved into the moderately and acutely energy-poor households groups, respectively. Also, 0.6% and 6.0% of the moderately energy-poor households from wave 2 moved into the energy non-poor and acutely energy-poor categories, respectively, in wave 3. Furthermore, between waves 2 and 3, 0.3% and 39.9% of acutely energy-poor households migrated into the non-energy-poor and moderately energy-poor groups, respectively. This corroborates the findings of Adepoju (2012) and Mba et al. (2018), who found that poverty status fluctuates over time. Consequently, households continuously enter and exit poverty over periods. Using Spell's approach, Table 6 displays the percentage of households in each energy poverty category. The chronic energy poverty rate was 61.4% and the transitory energy poverty rate was 17.0%, demonstrating that most rural Nigerian households are chronically energy poor. In contrast, 13.7% of transiently energy-poor households escaped energy poverty, whereas a smaller proportion (3.2%) fell into energy poverty

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Table 5. Transition matrix of household energy poverty status

Wave 2	**Wave 3**			
	Non-Poor	**Moderately Poor**	**Acutely Poor**	**Total**
Non-Poor	4(0.2)	32(1.4)	3(0.1)	**39(1.7)**
Moderately Poor	14(0.6)	1126(49.2)	138(6.0)	**1278(55.9)**
Acutely Poor	6(0.3)	912(39.9)	52(2.3)	**970(42.4)**
Total	**24(1.1)**	**2070(90.5)**	**193(8.4)**	**2287(100.0)**

Source: Authors' Computation.

Table 6. Multidimensional energy poverty transition status

Energy Poverty Status	**Frequency**	**Percentage**
Always Energy Non-poor	496	21.7
Entering Energy Poverty	74	3.2
Exiting Energy Poverty	314	13.7
Always Energy Poor	1403	61.4
Total	**2287**	**100.00**

Source: Authors' Computation.

Drivers of Transitions in Multidimensional Energy Poverty In Rural Nigeria

Table 7 provides the findings of multinomial logistic regression for rural household energy poverty transitions using the same set of explanatory factors as the multidimensional energy poverty determinants. The determinants were interpreted in terms of the relative risk ratios (RRR) of the explanatory factors in comparison to the base category. The base category is 'always energy non-poor households. The estimated Chi-square value was 1223.90 and statistically different from zero at a 1% significance level, suggesting that the model was well-fitted and the accuracy of the composite error term is guaranteed.

Entering energy poverty:

Energy poverty is a function of marital status, roofing materials, toilet facilities, asset value, and geographical location in the North-East. While marital status, roofing materials, toilet facilities, and residing in the North-East geopolitical zone had beneficial effects on energy poverty, asset value had the opposite effect. Income utilisation is expected to be high among married household heads, translating to energy poverty. By this, married household heads have a 4.5 times greater chance of slipping into energy poverty. In addition, type of household features, such as roofing materials and toilet facilities, raised the probability of slipping into energy poverty by 2.5 and 3.0 points. Being in the North-East geopolitical zone had a positive effect on the transition into energy poverty, suggesting that households in this geopolitical zone were 4.3 times more likely to fall into energy poverty. In contrast, when assets are employed productively, households are better off and can meet their demands in an emergency more rapidly. Thus, higher household asset accumulation reduces the likelihood of energy poverty. In other

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words, an increase of one Naira in the value of a household's assets reduces the likelihood of falling into energy poverty by a factor of one. This agrees with the findings of Amao et al. (2017).

Exiting energy poverty:

Household head age had a negative effect on the probability of exiting energy poverty, whereas primary occupation, wall materials, roof materials, toilet facilities, distance to market, and being in the North-East geopolitical zone had favourable effects. Age was negatively significant at 1.0%, indicating that a one-year increase in the age of the household head decreased the probability of households moving into the energy non-poor category by a factor of 1. Nonetheless, the positive effect of primary occupation on the probability of exiting energy poverty suggests that farming as a primary source of income enhances the probability of escaping energy poverty. Similarly, wall materials, floor materials, and toilet facilities all boost the likelihood of escaping poverty, indicating that access to improved housing infrastructure is an effective strategy for reducing energy poverty. Moreover, the distance from the market doubles the likelihood of escaping energy poverty by a factor of 1. In conclusion, energy-poor households will exit energy poverty in the following period due to improved housing conditions and closeness to markets, but aging will be a factor that perpetuates energy poverty.

Always energy poor:

Table VII indicates that levels of education, primary occupation, wall material, floor material, roof material, toilet facilities, distance to road, distance to market, and living in the North-East geopolitical zone all enhance the likelihood of chronic energy poverty. On the other hand, factors such as age, household size, credit access and asset value decreased the likelihood of chronic poverty in the study area. The interaction between chronic energy poverty and lack of formal education and primary education was strong. Specifically, an additional year of no formal education and the household head's primary education increased the likelihood of energy poverty odds by 2.0 and 2.4, respectively. This finding confirms the hypothesis that a low education level is closely connected with household energy poverty status (Adepoju, 2012; Muyanga et al., 2018). The absence or low levels of formal education may prevent households from gaining access to important information required to escape multidimensional energy poverty.

Similarly, farming as a primary occupation increased the likelihood of chronic energy poverty by a factor of 2.7. Furthermore, living in a house where straw, sand, dirt, pit, and mud are used as wall materials, floor materials, and toilet facilities increases the odds of remaining chronically energy poor as it depicts a low standard of living. On the other hand, the effect of household size on the likelihood of remaining energy-poor was negative. This suggests that an additional household member decreases the likelihood of energy poverty. This can be seen as the result of increasing family labour, which has led to greater productivity. This result corroborates Okoedo-Okojie and Onemolease's (2009) assertion that family labour is the predominant form of labour used in farming. Also, access to credit correlates adversely with chronic energy poverty by a factor of 1, indicating that people with access to credit are more likely to escape energy poverty.

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Table 7. Determinants of Multidimensional Energy Poverty Transitions in Rural Nigeria

	Entering Poverty			Exiting Poverty			Chronic Poverty		
Variable	**RRR**	**Coeff.**	**Z**	**RRR**	**Coeff.**	**Z**	**RRR**	**Coeff.**	**Z**
Age	0.991	-0.0093	-0.88	0.981	-0.0191	-2.92***	0.988	-0.0123	-2.16**
Household size	0.966	-0.0348	-0.82	0.996	-0.0045	-0.18	0.912	-0.0926	-4.02***
Gender	0.298	-1.2108	-1.38	.586	-0.5341	-1.26	0.446	-0.8068	-2.29**
Primary occupation	1.035	0.0344	0.11	1.649	0.4999	2.73***	2.695	0.9913	5.59***
Marital status	4.527	1.5101	1.76*	1.572	0.4527	1.19	1.253	0.2259	0.71
No education	1.829	0.6039	1.03	1.570	0.4513	1.44	2.049	0.7176	2.31**
Primary education	1.973	0.6793	1.33	1.333	0.2874	1.13	2.374	0.8646	3.27***
Secondary education	1.146	0.1366	0.23	1.091	0.0869	0.30	1.223	0.2016	0.67
House ownership	0.856	-0.1557	-0.35	0.892	-0.1148	-0.46	0.928	-0.0745	-0.32
Remittances	2.092	0.7379	1.10	0.839	-0.1752	-0.38	1.699	0.5301	1.33
Access to credit	0.739	-0.3017	-0.89	0.983	-0.0167	-0.09	0.709	-0.3512	-2.03**
Wall materials	1.270	0.2389	0.76	1.947	0.6662	3.38***	2.274	0.8213	4.74***
Roof materials	2.477	0.9069	1.68*	3.262	1.1824	2.93***	5.547	1.7131	4.61***
Floor materials	1.586	0.4609	1.40	1.169	0.1564	0.72	2.136	0.7590	4.08***
Toilet facilities	3.009	1.1017	3.42***	2.111	0.7475	3.69***	3.575	1.2740	7.00***
Assets value	0.999	-4.74e-06	-2.39**	0.999	-4.67e-7	-1.16	0.999	-7.27e-06	-7.06***
Distance to road	1.013	0.0129	0.62	1.016	0.0158	1.29	1.052	0.0503	4.54***
Distance to market	1.002	0.0022	0.54	1.007	0.0074	3.01***	1.010	0.0095	4.26***
North-Central	0.673	-0.3956	-0.54	0.867	-0.1430	-0.33	1.079	0.0765	0.19
North-East	4.304	1.4597	1.88*	2.388	0.8703	1.78*	6.214	1.8268	4.01***
North-West	1.693	0.5266	0.72	0.809	-0.2108	-0.46	1.881	0.6316	1.52
South-East	0.815	-0.2046	-0.30	0.742	-0.2977	-0.69	0.487	-0.7197	-1.84*
South-South	0.341	-1.0744	-1.39	0.670	-0.4004	-0.94	0.513	-0.6678	-1.70*
Number of observations		2,287							
Log-likelihood		-1709.0611							
LR $chi^2(69)$		1223.90							
Pseudo R^2		0.2637							

Source: Author's Computation *** Significant at 1%, ** at 5%, and * at 10%.

Conclusions

The prevalence of energy poverty in rural Nigeria as confirmed by this study necessitates a deeper understanding of its multidimensionality at the household level. The majority of rural households suffer from moderate energy poverty, with a larger proportion relying primarily on unclean energy sources. Furthermore, energy-poor households are heterogeneous, since some households enter and exit energy poverty while others remain poor. Thus apart from prioritizing government interventions in the geopolitical zones with the highest incidence of energy poverty in rural Nigeria, efforts should be targeted at transiently energy-poor households and predisposing factors which may change over time. For instance, energy policies that target households at various phases based on their energy poverty status could be developed. Also, enhancing the development of human capital to gain insight into cleaner energy sources and by extension a reduction in energy poverty among rural households in Nigeria could

be a step in the right direction. In partnership with corporate entities and non-governmental organisations, policies that will fund initiatives such as household energy support programmes, which are required to transition chronically energy-poor households into energy-non-poor households could be developed. In addition, adequate programmes to raise awareness of the environmental and health risks associated with the use of unclean energy sources, such as firewood could be designed. In addition, rural community markets could aid in the sale of agricultural products and bring households closer to modern energy sources.

References

Adepoju, A. O. (2012). Poverty transitions in rural south west Nigeria. *Global Journal of Science Frontier Research Agriculture and Biology, 12* (2), 19–30.

Adeyonu, A. G., Oni, O. A., Omonona, B. T. & Okoruwa, V.O. (2012). Seasonality in poverty level of rural farming households in Oyo State Nigeria. *Journal of Agricultural and Biological Science, 7* (8), 570–575.

Agu, C. & Orji, A. (2015). Regional poverty and inequality in nigeria: do sectoral growth dynamics matter? In Poverty: global challenges, role of inequality and reduction strategies. (Agu, C. Ed.) Nova Science Publishers, USA. 55-81.

Akerele, D. & Adewuyi, S. A. (2011). Analysis of poverty profiles and socioeconomic determinants of welfare among urban households of Ekiti state, Nigeria. *Current Research Journal of Social Sciences, 3* (1), 1–7.

Alkire, S. (2007). The missing dimensions of poverty data: introduction to the special issue. *Oxford Development Studies, 35* (4), 347–359.

Alkire, S. & Foster, J. (2011a). Understandings and misunderstandings of multidimensional poverty measurement. *Journal of Economic Inequality, 9* (2), 289–314.

Alkire, S. & Foster, J. (2011b). Counting and Multidimensional Poverty Measurement." *Journal of Public Economics, 95*, (7–8), 476–487.

Alkire, S. & Santos, M. E. (2012). Acute multidimensional poverty: a new index for developing countries. *Social Science Research Network Electronic Journal*. DOI:10.2139/ssrn.1815243.

Amao, J. O., Ayantoye, K. & Fanifosi, J. E. (2017). An analysis of multidimensional poverty and its determinants in rural Nigeria. *Journal of Development and Agricultural Economics, 9* (11), 303–311.

Apere, T. O. & Karimo, T. M. (2014). Multidimensional energy poverty in Nigeria: A National and Zonal Level Analysis. *British Journal of Advance Academic Research, 3* (1), 83–92.

Ashagidigbi, W. M., Babatunde, B .A., Ogunniyi, A. I., Olagunju, K. O. & Omotayo, A. O. (2020). Estimation and determinants of multidimensional energy poverty among households in Nigeria. *Sustainability, 12* (18), 1–13.

Awan, R. U., Falak, S. & Akhtar A. (2013). An Investigation of multidimensional energy poverty in Pakistan. *The Pakistan Development Review,52* (4), 405–418.

Babatunde, R. O., Olorunsanya, E. & Adejola, A. D. (2008). Assessment of rural household poverty: evidence from south-western Nigeria." *Journal of Agriculture and Environmental Science, 3* (6), 900–

905.

Bazilian, M., Nussbaumer, P., Cabraal, A., Centurelli, R., Detchon, R., Gielen, D., Rogner, H.-H. , Howells, M., et al. (2010). Measuring energy access: supporting a global target. expert meeting "galvanizing political commitment for universal energy access". The Earth Institute, New York, NY, USA. http://en.openei.org/wiki/Measuring_Energy_Access:_Supporting_a_Global_Target

Bersisa, M. (2016). Multidimensional measure of household energy poverty and its determinants in Ethiopia. *Economic Transformation for Poverty Reduction in Africa: A Multidimensional Approach*, 59–84. .

Edoumiekumo,S. G., Tombofa, S. S. & Karimo, T. M. (2013). Multidimensional energy poverty in the south-south geopolitical zone of Nigeria. *Journal of Economics and Sustainable Development, 4* (20), 96–104.

Ehinmowo, A. B., Ufondu, M. N. & Aliyu, M. (2018). Energy poverty and the security challenges in northern Nigeria-incidence and the potential for renewables, *Covenant Journal Of Engineering Technology, 2* (2), 40–51.

Gaye, A. (2008). Access to energy and human development." *Human Development Report*. Retrieved from https://hdr.undp.org/content/access-energy-and-human-development.

Huang, W. H. (2021). Sources of inequality in household electricity consumption: evidence from Taiwan. *Energy Sources, Part B: Economics, Planning and Policy*, *17* (1), 1–22.

IEA (2010). Energy poverty - how to make modern energy access universal?, IEA, Paris. Retrieved from https://www.iea.org/reports/energy-poverty-how-to-make-modern-energy-access-universal.

Israel-Akinbo, S. O., Snowball, J. & Fraser, G. (2018). An investigation of multidimensional energy poverty among South African low-income households. *South African Journal of Economics, 86* (4), 468–487.

Masud, J., Sharan, D. & Lohani, B. N. (2007). Energy for all: addressing the energy, environment, and poverty nexus in Asia," Asian Development Bank, pp 1–123.

Matewos, K. R., Navkiranjit, K. D. & Jasmindeep, K. (2016). Financial literacy for developing countries in Africa: a review of concept, significance and research opportunities. *Journal of African Studies and Development, 8* (1), 1–12.

Mba, P. N., Nwosu, E. O. & Orji, A. (2018). An empirical analysis of vulnerability to poverty in nigeria: do household and regional characteristics matter? *International Journal of Economics and Financial Issues, 8* (4), 271–276.

Mbewe, S. (2017). Investigating household energy poverty in South Africa by using unidimensional and multidimensional measures. Retrieved from https://open.uct.ac.za/bitstream/handle/11427/29336/thesis_ebe_2018_mbewe_samson.pdf?sequence=1&isAllowed=y.

Moyib, F. R., Ojo, S. O. & Ayodele, I. A. (2017). Incidence and severity of poverty among Oyan Lake host communities' households in Ogun State, Nigeria. *Ghana Journal of Development Studies, 14* (2), 164.

Muyanga, M. C., Bundi, M. & Ayieko, M.W. (2018). Transient and chronic rural household poverty: evidence from Kenya. *Social Science Research Network Electronic Journal*. DOI:10.2139/ssrn.3173099.

National Bureau of Statistics. 2010. *Nigeria Poverty Profile 2010*. Retrieved from https://www.nigerianstat.gov.ng/pdfuploads/Nigeria%20Poverty%20Profile%202010.pdf. 13.02.2019

Nussbaumer, P., Bazilian, M. & Modi, V. (2012). Measuring energy poverty: focusing on what matters. *Renewable and Sustainable Energy Reviews, 16* (1), 231–243.

Obayelu, O. A. & Awoyemi, T. T. (2010). Spatial Dimension of Poverty in Rural Nigeria. *Journal of Development and Agricultural Economics*, 2 (6), 231–244.

Ogunniyi, L. T., Adepoju, A. A. & Olapade-Ogunwole, F. (2012). Household energy consumption pattern in Ogbomoso Metropolis, Oyo State Nigeria. *Continental Journal of Agricultural Economics, 6* (1), 10–16. DOI:10.5707/cjae.2012.6.1.10.16.

Ogwumike, F. O. and Akinnibosun, M. K. (2013). Determinants of poverty among farming households in Nigeria. *Mediterranean Journal of Social Sciences, 4* (2), 365–373. DOI:10.5901/mjss.2013.v4n2p365.

Ohiare, S. (2015). Expanding electricity access to all in Nigeria: a spatial planning and cost analysis. *Energy, Sustainability and Society,* 5 (8). DOI: https://doi.org/10.1186/s13705-015-0037-9.

Okoedo-Okojie, D.U. and Onemolease, E. A. (2009). Factors affecting the adoption of yam storage technologies in the Northern Ecological Zone of Edo State, Nigeria. *Journal of Human Ecology, 27* (2),155–160.

Olawuyi, S. (2013). Assessment of rural households poverty in Nigeria: evidence from Ogbomoso agricultural zone of Oyo State, Nigeria. *Journal of Scientific Research and Reports, 2* (1), 35–45.

Omotesho, O. A. & Muhammad-Lawal, A. (2010). Optimal food plan for rural households' food security in Kwara State, Nigeria: The goal programming approach. *Journal of Agricultural Biotechnology and Sustainable Development, 2* (1), 7–14.

Onu, J. I. & Abayomi, Z. (2009). An analysis of poverty among households in Yola metropolis of Adamawa State, Nigeria. *Journal of Social Sciences, 20* (1), 43–48.

Orji, A., Ogbuabor, J.E., Nwosu, E., Anthony-Orji, O. I. & Amoji., N. (2020). Analysis of poverty correlates and multi-dimensionality in south east Nigeria: new empirical evidence from survey data. *Poverty and Public Policy, 12* (3), 255–270.

Orji, A., Ogwu, S. O., Mba, P. N. & Anthony-Orji, O. I. (2021). Energy demand and cooking energy cost in an oil-rich economy: a new evidence from Nigeria. *Studia Universitatis Vasile Goldis Arad, Economics Series, 31* (1), 1–21.

Ozughalu, U. M. & Fidelis O. Ogwumike (2019). Extreme energy poverty incidence and determinants in Nigeria: a multidimensional approach. *Social Indicators Research, 142* (3), 997–1014.

Pachauri, S. & Spreng, D. (2004). Energy in and use relation access energy to poverty. *Economic and Political Weekly, 39* (3), 271–278.

www.mirdec.com CONFERENCE PROCEEDINGS: FULL PAPER SERIES ISBN: **978-605-74781-9-1**

Sokona, Y., Mulugetta, Y. & Gujba, H. (2012). Widening energy access in africa: towards energy transition. *Energy Policy, 47* (supp.1), 3–10.

Sovacool, B. K. (2012). The political economy of energy poverty: a review of key challenges. *Energy for Sustainable Development*, *16* (3), 272–282.

United Nations (2014). *An Action Agenda for Sustainable Development: Report for the UN Secretary-General*. *Sustainable Development Solutions Network*. Retrieved from https://unstats.un.org/unsd/broaderprogress/pdf/130613-SDSN-An-Action-Agenda-for-Sustainable-Development-FINAL.pdf. 16.04.2019.

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ELECTROLYTIC HYDROGEN PRODUCTION: ASSESSING MAIN DRIVERS TOWARDS A SUSTAINABLE ENERGY SYSTEM IN EUROPE

Abstract

Electrolytic hydrogen (H2) production has been exponentially growing in the last years in Europe. In a context of decarbonisation urgency, the EU has decided to implement 40GW of renewable H2 electrolysis capacity by 2030, which will naturally impose huge efforts from all its member states. The aim of this study is to investigate the factors influencing the development of aggregated electrolytic H2 production capacity. Our analysis focuses on the role of political, socioeconomic, technological, and environmental drivers in shaping the adoption of green H2 technologies. Using a sample of European countries, the study examines the significance of the chosen variables to explain the variation in electrolytic H2 production capacity. The findings reveal that political variables, particularly the strictness associated to environmental taxes and investment related to R%D expenditure (innovation) are the main contributors to the model estimation. Additionally, energy dependence exhibits a negative relationship with electrolytic capacity, which can be attributed either to the economic context of some European countries, specifically with small geographical areas, with high reliance on neighboring countries and robust interconnections (Luxembourg) or to other, more immediate, less expensive energy options (case of Cyprus and Malta). The study underscores the need for comprehensive strategies that consider multiple factors, including political will, socioeconomic context and the viability of renewable resources, to promote the adoption of electrolytic H2 technologies. These findings contribute to a deeper understanding of the complex dynamics involved in the energy transition towards sustainable and decarbonized energy systems.

Keywords: Electrolytic capacity, green H2, drivers

JEL Codes: O10, O13

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1. Introduction

The global energy system has suffered significant transformations over time due to the growing emphasis on economic growth, coupled with population booming and rapid urbanization. The traditional energy supply model, relying heavily on geographically limited and challenging-to-access fossil fuels, has led to negative outcomes, such as pollution, greenhouse gas emissions and inefficiency (Holden, Linnerud & Rygg, 2021). Carbon emissions resulting from fossil fuels as our primary energy source have been a significant contributor to global warming since the industrial revolution and have increasingly worsened from the 1970s onwards (Ritchie, Roser & Rosado, 2020). Addressing the challenge of decarbonizing the power supply in the electricity generation, transportation, and industrial

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sectors over the next three decades has become a pressing concern. Therefore, numerous countries are investing in clean energy research given the urgent need to combat climate change. Hydrogen has emerged as a key energy vector for medium to long-term decarbonisation strategy due to its potential to produce, store and transport energy in an efficient and clean manner, being also a valuable contributor to a low-carbon energy mix in the future (Raman, et al., 2022). Despite not being currently recognized as the most significant player in the global energy system, it is expected that a green- H_2 economy will help to achieve a 100% renewable energy society (de Oliveira et al., 2022). Meanwhile, by 2050, Green H_2 cost production is expected to be competitive with fossil fuels thus playing an important part in the global energy system.

The main pathway for producing green H_2 is through water electrolysis, powered by renewable electricity (Ursua, Gandia & Sanchis, 2011; Chi & Yu, 2018). With H_2 projected to become an important energy carrier, the availability of low-cost and reliable electrolytic capacity is essential to support the large-scale deployment of H_2 production infrastructure. Due to international efforts to limit the temperature rise to 1.5 °C above pre-industrial levels, The European Union (EU) has set ambitious targets for the development of a H_2 economy, with a goal to achieve 40GW of renewable H_2 electrolysis capacity by 2030 (UNFCCC, 2015; European Commission, 2020). Meeting this target will require significant investment in the development and deployment of electrolysis technologies, as well as supportive policy measures to facilitate market growth. The importance of electrolytic capacity cannot be overstated, as it will be a major driver in the successful scaling of the European H_2 market, positively contributing to both sustainability and stability targets. It is expected that green H_2 and electricity will complement each other to have a positive impact on all energy-related sectors, thus facilitating the realization of a 100% renewable energy society (Oliveira, Beswick, & Yan, 2021).

The Russian invasion of Ukraine emphasized the acceleration of the energy transition, even if it implies greater energy independence for Europe. In just a few years, the issue of climate protection has also included a new perspective over energy security planning (Rabbi, et al., 2022). In the aftermath of this event, EC launched the RePower plan. It has the objective to reduce the EU's dependence on Russian gas by increasing domestic production and imports of cleaner, alternative energy options, including green H_2 (REPowerEU Plan, 2022). Moving towards green H_2 is seen as crucial in the long-term goal of fully decarbonizing the energy system, as well as mitigating the risk of supply disruptions and price spikes in energy markets caused by geopolitical conflicts (Fernández, et al., 2023).

To provide a comprehensive understanding of the investment in electrolyzer capacity, it is important to identify and analyze the several drivers that are involved. These may include variables linked to the economic scope, social behaviors, political or even environmental factors that have the influence the decision-making process (Ziolo et al., 2019). This paper contributes to the existing literature by providing empirical insights into the drivers that influence the use of electrolytic H_2 in Europe.

The objective of this paper is to investigate the main drivers that influence the installed capacity of electrolyzers, as a method to evaluate the variability of green H_2 production. Additionally, this paper aims to examine if the results are consistent with the proposed drivers and if any other can be identified. The remainder of this paper is structured as follows. Section 2 presents a review of the literature and contextualizes the ongoing debate about renewable and green H_2 production. Section 3 outlines the explanatory variables, hypotheses and overall methodology used in this study. Section 4 provides the main results of the study. Section 5 presents a discussion of the findings, and Section 6 concludes by highlighting the main contributions of this study to the literature.

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2. Literature Review

H_2 production includes a variety of possibilities, including both renewable and non-renewable sources. Currently, most of H_2 production relies on non-renewable sources, such as conventional steam methane reforming (SMR) or coal gasification (grey H_2). These methods are linked with massive carbon dioxide (CO2) emissions: SMR has an emission factor of 8.9 kg CO2/kg H_2, while coal gasification's is even worse, with 29.33 kg CO2/kg H_2 (Boulamanti & Moya, 2017). Grey H_2 is associated with with 830 MtCO2e emissions per year, which represents 2.3% of total global CO2 emissions (Kakoulaki et al., 2021). Blue H_2 is also produced through SMR, which splits natural gas (NG) into H_2 and CO2, coupled with industrial carbon capture and storage (CCS) techniques (Kumar & Lim, 2022). Still, some of the generated CO2 remains un-captured (5-15%), and there are uncertainties regarding the long-term impacts of storage, as well as the potential for leakage that could negatively affect the environment and climate (IRENA, 2019).

An alternative to fossil fuels is the production of green H_2 (renewable H_2). Water, being the most natural abundant source of H_2, can split into H_2 and oxygen through the application of an electric current, resulting in no greenhouse gas emissions when the process is derived entirely from renewable sources (Oliveira, et al., 2021). There are several electrolyte systems, such as anion exchange membranes (AEMs), alkaline water electrolysis (AWE), solid oxide water electrolysis (SOE), and proton exchange membranes (PEMs); all having the same principle but with different materials usage and with distinct operation conditions (Agyekum, Nutakor, Agwa, & Kamel, 2022). Renewable H_2 offers unique advantages when it comes to energy systems. It has been widely acknowledged as a promising solution for promoting energy integration across various sectors. This can be achieved through the implementation of Power-to-Gas strategies that optimize the timing of energy storage when the grid is unable to handle more energy or even through H_2 injection into the NG infrastructure on early phases of the transition (Caglayan, et al., 2021; Pastore, Basso & de Santoli, 2022). According to some authors, integration of green H_2 should be a phased process (Oliveira, et al., 2021), in which the first phase involves implementing innovation in industries with high global demand, such as the chemical synthesis industry. The second phase focuses transportation, specifically for heavy-duty and long-range fuel cell vehicles, as well as blending with NG pipelines for heating. The third phase focuses on using H_2 to generate high-grade heat for industrial processes and present an alternative for seasonal energy storage in the power sector, allowing for near-total decarbonization of the energy sector.

To promote the energy transition, Europe has already begun to leverage the production of green H_2, which has boomed in recent years. Similar to renewable energy promotion, where this region was a pioneer in terms of policies implementation (at the end of the 1980s in Denmark), Europe has already went through several policy adjustments and reforms, besides developing various country-level approaches that provide valuable data for detailed econometric analysis (Bersalli, Menanteau & El-Methni, 2020). Since the 2000s, Europe has invested significantly in green H_2 Research and Development (R&D), leading any other global region in terms of early concepts, demonstrations and feasibility studies (IEA, 2022). As a result, there has been a positive impact on the increasing capacity of electrolyzers, as shown in Figure 1.

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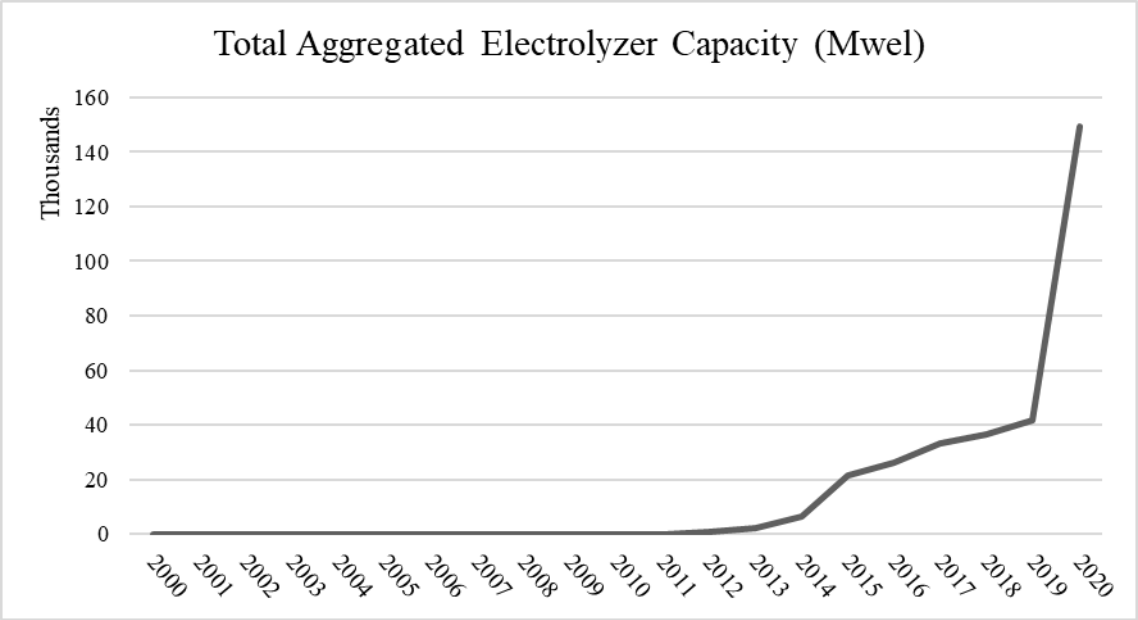
Figure 1 – Total Aggregated Electrolyzer Capacity in Mwel in Europe* (Normalised capacity). Data from IEA H2 Projects Database. *UE27 + UK, Iceland and Norway



Source: Authors. Own elaboration with data from the IEA H2 Project database.

Despite the potential of H_2 technologies to integrate various energy systems, plans to scale up production of electrolyzers are facing significant challenges. Production costs are obviously one of the main barriers, which is the result of the price of electricity and the capital cost of the electrolyzer system (Bristowe & Smallbone, 2021). For example, in the United States 59%–68% of the total electrolysis-based production costs are directly linked to electricity costs (Guerra, Eichman, Kurtz & Hodge, 2019). To create a fair and competitive scenario for future energy markets, lowering overall costs through a proper policy strategy is a critical step to produce green H_2 in significant quantities, so that newly technologies can compete with fossil fuel-based technologies (Polzin et al., 2015). It is estimated that to replace the current use of fossil fuels, H_2 should be priced as low as 1 $/kg, in contrast with its current cost of 10 $/kg (Bristowe & Smallbone, 2021). In addition to a proper policy framework, R&D initiatives are vital to promote the widespread adoption of H_2 by developing new materials with improved performance for electrolyzers and reliable storage systems, as well as evaluating the enhanced operational flexibility of electrolyzers and robust solutions for fuel cells (Guerra et al., 2019). Considering the development of new materials, this approach may create also a significant challenge, as it could result in new dependencies on suppliers of critical raw materials and components. Some authors even suggest that Europe should re-evaluate its current focus on green H_2 and potentially relax regulations while actively managing the supply of raw materials (Ansari, Grinschgl & Pepe, 2022).

The absence of a proper H_2 market is also a challenge to overcome by pioneer countries. Despite possessing stricter policies/strategies over several environmental issues (such as carbon tax regulations or even the Emissions Trading System), Europe still strives for a proper H_2 market penetration. Some experts even consider that it won't be achievable before 2030, due to high electricity prices and the lack of decentralized production (Tlili, Mansilla, Frimat & Perez, 2019).

Clean energy investment has been steadily increasing over the past decade and is expected to exceed USD 1.4 trillion in 2022, with almost three-quarters of the overall energy investment growth (IEA[2],

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2022). Besides the growing awareness about climate change issues, this is related with efforts on developing new policies and innovative frameworks, together with regulations and other financial incentives focused on sustainable alternatives. Addressing market failures through new proposals for the functioning of the sector allowed for the adaptation of the conventional energy system, which was designed towards the use of fossil-based energy. Therefore, it is widely accepted that new forms of energy production, supported by disrupted forms of technologies, are greatly promoted by public policies (Kaya, 2006; Polzin et al., 2015; Gürtler, et al., 2019; Bersalli et al., 2020; Gulagi, et al., 2020; Solaymani, 2021; Olabi & Abdelkareem, 2022). However, public policies are not the only drivers in favor of renewable energy production. Other factors such as technical advancements, economic or socio-political conditions can significantly influence the rate of adoption of renewable energy technologies (Darmani, et al., 2014; Sisodia, Soares & Ferreira, 2016; Bersalli et al., 2020; Egli, 2020; Khan, et al., 2022; Azhgaliyeva, Beirne & Mishra, 2023; Sachan, et al., 2023).

Several studies and initiatives promote the exploration of the factors that drive the adoption and implementation of renewable energy. A study on renewable energy consumption in Africa found that the use of renewable energy is negatively correlated with energy intensity, while it is positively correlated with natural gas rents (Olanrewaju, Adenikinju, & Akintande, 2019). The same authors also found that reducing carbon intensity leads to an increase in renewable energy consumption, while reducing reliance on coal and oil rents could also increase the use of renewable energy. Another work explores the relationship between renewable energy investment, oil prices, gross domestic product (GDP) and interest rates through a time series approach (Shah, Hiles & Morley, 2018). The main conclusion was that countries with less support for the renewable energy sector may have greater dependence on macroeconomic factors and substitutes like oil. Przychodzen & Przychodzen presented a paper with new evidence considering economic and political factors that affect the transition to a low-carbon economy through renewable energy generation. They found that economic growth, unemployment, and government debt were all factors that stimulated the use of renewable energy, while increasing CO2 emissions per capita, competition policy and energy market competitiveness limited the renewable energy scaling (Przychodzen & Przychodzen, 2020).

Regarding works investigating the drivers to promote clean H_2 economies, the academic literature does not have much to offer (Van de Graaf, et al., 2020; Noussan, et al., 2020). However, some studies investigate the factors that affect the production of renewable energy. A work that considered 32 countries using panel data techniques indicated that GDP per capita is a positive contributor to renewable energy consumption, while oil prices do not seem to have a strong relationship with the use of renewable H_2 (Wang, Mi, Nistor, & Yuan, 2018). It also concluded that social awareness of climate change and energy security concerns alone are not enough to promote the switch from traditional to renewable energy sources, as well as market mechanisms cannot fully encourage the use of renewables by their own. Other study used OLS and panel data techniques to investigate the impact of various factors on H_2-based renewable energy production in Europe (35 countries) (Xu, Chou & Zhang, 2019). These explanatory variables included greenhouse gas emissions, per capita income, the scale of labor force input or the portion of added value in manufacturing industry. The results showed that economic input and income levels had a positive effect on renewable energy production, suggesting that economic growth can promote environmental awareness and encourage the use of renewable energy. A recent work analyzed data from 52 countries over a 6-year period, and investigated various sectorial, energy regulation, and macroeconomic variables to assess their impact on the green energy transition policy (Pantaleone, & Fazioli, 2022). The results showed that lock-in effects on fossil fuel policies may hinder the development of green energy solutions, while countries already investing in renewable energy are more likely to invest in H_2 projects, suggesting a reinforcement of green sustainable strategies. This seems to be in accordance with a previous work, that referred there is a notable and substantial correlation between the preceding period's use of renewable energy and the current level of usage (Marques & Fuinhas, 2011).

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Overall, the academic literature on renewable energy sources and electrolytic H_2 production emphasizes the significance of policy measures and macroeconomic factors for effectively promoting green innovation towards a more sustainable future. In other words, a political approach to these aspects can have a substantial impact on the successful transition to environmentally friendly practices.

3. Methodology

Our hypothesis aims to test how a group of chosen variables influences the development of aggregated electrolytic H2 production capacity. Recognizing the constraints imposed by a limited dataset, our study is driven by the objective of conducting a comprehensive analysis despite the scarcity of available information. To address this challenge, we have opted to employ an econometric panel data model as our analytical approach, enabling us to mitigate the impact of data limitations. Through this methodological choice, we aim to extract meaningful insights from the available data. A panel data is able to supply more information, greater variance, higher degrees of freedom and less collinearity between variables (Marques, Fuinhas & Manso, 2010). It is also assumed that there are time-invariant features for which the model is unable to control (due to lack of data), that are related to country specific effects. Therefore, a fixed effects model is used, which nullifies the country specific effects and allows to better measure the impact of the time-varying effects.

a. Data

In order to build our database, we used data collected from 3 main sources, namely the OECD, the Eurostat and the H_2 Project Database by the IEA. The latter was used to gather information about incremental gains over the years considering the electrolytic production capacity. It encompasses all H_2 H_2 projects worldwide that have been operational since the year 2000, reflecting various ambitions focused on reducing CO2 emissions associated with H2 production or promoting it as the "next-generation" energy carrier, due to its potential as a low-carbon technology option (IEA, 2022). The Eurostat and OECD database sources were mainly used to collect data for the explanatory variables (OECD, 2022; Eurostat, 2022[1-7]). The table in the appendix defines the variables, its measures, and summarizes its descriptive statistics (Table A1).

Our explanatory variables encompass a range of socioeconomic, technological, environmental and political factors. The purpose of including these variables is to identify a comprehensive set of factors that can potentially explain the variability in electrolytic H_2 production across the countries under analysis. The selection of these variables aligns with previous studies that have employed panel data analysis to explore the determinants influencing a specific outcome (Marques, Fuinhas & Manso, 2010; Marques & Fuinhas, 2011; Wang et al., 2018).

The inclusion of socioeconomic variables allows for the examination of factors such as GDP, energy consumption, energy dependence, industrial or transportations performances, which can be possibly related with the demand and investment in H_2 electrolytic production. Technological variables, such as renewable energy or nuclear capacity, can also provide some insights into the availability and development of technologies that may be linked with electrolytic capacity. We also included an environmental variable, in an attempt to assess if different carbon emissions patterns influence the development and deployment of electrolytic capacity. Additionally, political variables, are probably the most important when assessing risky, immature, novel technologies. Stringency related to policy frameworks, government strategic plans and regulatory measures should be linked with different outcomes, either promoting or impeding the production of green H_2.

The existing data relates to 21 years of data on a yearly resolution, through 30 European countries with announced projects to develop electrolytic H_2 capacity. The combination of both dimensions can provide

a relevant panel data model capable of understanding the drivers that influence the main motivations on expanding electrolytic H_2 capacity in Europe. In total, 630 observations were considered.

As mentioned earlier, our analysis will focus a group of EU countries. Specifically, we have combined the UE-27 countries with Iceland, Norway, and the United Kingdom. Although Switzerland and Turkey were intended to be part of this dataset, we had to exclude them due to insufficient data on several variables. Our reasoning for selecting these countries is based on the fact that they share many common policies, similar ambitions for energy transition, and comparable economic contexts. All variables with asymmetric distribution were replaced with its natural logarithm, in order to address inconsistency in estimates.

b. Analysis

A fixed effects model is typically implemented as a two-step estimator. In the first step, a de-meaning process is applied, where the average of each variable is subtracted from its respective values. This procedure effectively removes the individual-specific effects from the variables, allowing for a more precise estimation of the model parameters. This de-meaning process also removes any country specific fixed effect, observed or non-observed. Defining y_{it} as the target, X_{it} the time-variant exogenous variables, α_i as the time-invariant country specific effects, u_{it} as the random error and $(\overline{y_\iota})$,$(\overline{X_\iota})$, $(\overline{\alpha_\iota})$ $(\overline{u_\iota})$ are the corresponding averages in term of time, then the fixed effects model is given by:

$$\text{Eq 1: } (y_{it} - \overline{y_\iota}) = (X_{it} - \overline{X_\iota})\beta + (\alpha_i - \overline{\alpha_\iota}) + (u_{it} - \overline{u_\iota})$$

Since α_i does not depend on time, $\alpha_i = (\overline{\alpha_\iota})$ cancelling themselves above, resulting in a classical OLS estimator in which each time-variant feature equals itself minus its average.

The exogenous variables considered in our analysis span from 2000 to 2020, whereas the target variable pertains to the years 2010 to 2030. This choice corresponds to our goal of assessing the potential impact of a set of variables on the promotion of electrolytic H_2 capacity in the near future, based on projects with confirmed operational start dates. However, due to the long-term planning involved in such projects, there is no guarantee that the electrolytic H_2 installation be completed within the designated period, or even be concluded at all. Nonetheless, this is outside the scope of our study, as we focus solely on the commitment to increase electrolytic H_2 capacity.

In line with other studies examining the influence of macroeconomic variables on investments, we assumed a one-year time lag. This decision is based on the relatively short period of analysis. The estimation will incorporate a time lag variable, which represents the dependent variable (AECLOG) in the preceding period (AECLOGLAG) (Marques & Fuinhas, 2011).
By employing this approach, we can effectively address the challenges of endogeneity and collinearity within the variables (avoiding autocorrelation problems). Additionally, it provides a means to evaluate the sustained commitment to renewable energy through the examination of electrolytic H_2 capacity.

4. Results

During the data analysis, two additional transformations were introduced to maximize the information retained. Firstly, in cases where the electrolytic capacity of a particular country was equal to zero, indicating the absence of electrolytic H_2 capacity, all values were adjusted to -4. This adjustment allowed the logarithmization of the AECLOG variable, thereby preventing any potential errors during the model estimation process and ensuring the inclusion of important data pertaining to changes over the selected period. Secondly, an additional transformation was required specifically for the UK regarding the ETAX variable, since no values were available. As a result, the statistical program removed this particular

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cross-section from the analysis. To preserve the inclusion of this variable and avoid further loss of information, the missing values were transformed to 0.

Our dataset covered 21 years (2000 – 2020) and consisted of 615 observations, due to the presence of null or missing values due to 15 observations omission. The model presents a high R-squared value (0.9401), indicating a strong relationship between the selected variables. All regression parameters suggest a good balance between fit and complexity. The F-statistic and its associated probability (213.7074; 0.000) indicate a strong significance of the model and the Durbin-Watson statistic (2,0309) suggests minimal autocorrelation in the residuals. In Table 1 we reveal the results of our fixed effect model.

Table 1. Model Estimation and Effects Specification

Regression parameters	Value	Regression parameters	Value
R-squared	0.9401	Root MSE	0.6675
Adjusted R-squared	0.9357	Mean dependent var	-0.7450
S.E. of regression	0.6921	S.D. dependent var	2.7293
F-statistic	213.7074	Durbin-Watson stat	2.0309
Prob(F-statistic)	0.0000		

Source: Authors. Own elaboration using Eviews 12.

Among the variables examined, RDE (38.5844) and ETAX (10.6029) have positive coefficients while having a statistically significant impact (p-values: 0.0067 and 0.0034, respectively). On the other hand, variables such as FECIND (1.3337) exhibit a positive coefficient but do not reach statistical significance (0.3278). Variables including ED2 (-0.4284), FFFECIND (-0.6507) and EPN (-0.7658) display a negative relation with aggregated electrolytic capacity. Of these variables, ED2 stands out as statistically significant, with p-value of 0.0195.

The analysis indicates that the lagged electrolytic capacity, energy dependence, environmental taxes and R&D expenditure are significant factors influencing the aggregated electrolytic capacity. Countries with higher energy dependence levels, a low R%D expenditure value and lower income from environmental taxes tend to exhibit lower capacity.

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Table 2. Regression Results for AECLOG Dependent Variable. Data for all European Countries

Variable	Coefficient	p-value	t-Statistic
RDE	38.5844	0.0067	2.7191
ETAX	10.6029	0.0034	2.9410
FECIND	1.3337	0.3278	0.9795
AECLOGLAG	0.7844	0.0000	31.0247
FECTRA	0.4353	0.8219	0.2252
GDPLOG	0.2536	0.7470	0.3228
EPWPH	0.2015	0.8017	0.2513
YEAR	0.0381	0.0809	1.7487
FFFECTRA	-0.3835	0.8391	-0.2031
ED2	-0.4284	0.0195	-2.3415
FFFECIND	-0.6507	0.3906	-0.8592
EPN	-0.7658	0.1055	-1.6214
GHGLOG	-1.8068	0.0945	-1.6750
C	-76.6705	0.0714	-1.8060

Source: Authors. Own elaboration using Eviews 12.

The correlation matrix (Table A.2 – Appendix) presents valuable information about how variables are related to each other, providing the strength and direction of their linear relationships. In summary, there is a high positive correlation between AECLOG and AECLOGLAG (dependent variable and the time-lag), which is expected (0.9635). Between explanatory variables, there is a decent correlation between FECTRA and FECIND (-0.6347), as well as in GDPLOG when compared with AECLOG (0.5469) and AECLOGLAG (0.5477). The RDE variable is also slightly correlated with AECLOG (0.5469) and AECLOGLAG (0.5747). These are the six correlations that present a higher value.

5. Discussions

Our proposed hypothesis tests how a group of chosen variables influences the development of aggregated electrolytic H_2 production capacity. Urging for decarbonisation measures will require huge efforts from all involved governments, leaders and other interested parties, which is, in part, confirmed by our estimation results. The two political proxies (ETAX and RDE) are, by far, the most contributors to significance of our proposed model, while energy dependence (ED2) presents a negative significant relation with the dependent variable. Considering political drivers, there are several studies with similar outcomes, namely with renewable energy (Ackah & Kizys, 2015; Xu, Chou & Zhang, 2019; Bersalli, Menanteau & El-Methni, 2020). ETAX and RDE reflect the political will when considering environmental taxes and innovation, being the main drivers when explaining electrolytic capacity

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variability under our base conditions. This result is highly in line with academic literature due to the role of the political support when promoting risky, novel technologies that require a long-term commitment and investment in such endeavors.

Socioeconomic factors were examined through six variables. Among them, ED2 was found to have a significant negative impact. To gain a deeper understanding of this point, it is important to emphasize that some European countries included in the analysis are characterized by small geographical areas with strong interconnections with neighboring countries (Luxembourg) or isolated contexts, leading to high energy dependence rates (such as Malta, Cyprus, Ireland). These factors likely contribute to the statistical significance of the ED2 variable, since in several of these countries the aggregated electrolytic capacity will remain 0 until 2030. Additionally, it is noteworthy that countries with high energy dependence face significant challenges in investing in costly and riskier options compared to those with more favorable circumstances. Consequently, these countries prioritize renewable energy and other economically viable alternatives over green H_2 technology. This prioritization aligns with their pursuit of decarbonization goals, where green H_2 plays a secondary role.

The other socioeconomic factors we considered did not show significant relevance in our estimation. GDP, which represents a country's wealth generation, was not found to be statistically significant in explaining electrolytic H_2 production, aligning well with the context of our study. Over the past decades, the EU has made significant efforts to pursue a common energy goal, in order to deal with several problems associated with energy security issues and decarbonisation urgency. These efforts have the potential to overcome initial investment barriers, particularly in less economically robust economies, and provide an opportunity for them to be included among the countries pioneering electrolytic H_2 technologies. Political motivations at European level, geographic location, the viability of renewable natural resources (such as wind or solar) or the energy mix profile are other potential determinants that may influence a low-income country's decision to opt for electrolytic H_2 production.

The percentage of final energy consumption allocated to the industry and transportation sectors was also examined (FECIND and FECTRA), but no significant findings emerged. Several European countries have already published their strategies focusing on these sectors for H_2 utilization, indicating their potential significance. However, our analysis did not reveal a significant correlation between the percentage of energy consumption and electrolytic H_2 production capacity. This may be due to the early stage of our research, as it takes time for the impact of these sectors to become evident. Alternatively, it suggests that successful implementation of H_2 technologies in these sectors requires more than simply high-energy consumption. The development of a robust infrastructure, the implementation of advanced storage mechanisms and the establishment of new industry hubs are crucial steps towards establishing a fully functional H_2 value chain. These prerequisites are crucial for facilitating the effective integration and utilization of H_2 technologies, which are still in the early stages of implementation. Following the tendency to replace or substitute higher input prices, we have also tested the chance on the same traditional fossil-fuel based sectors (FFFECIND and FFFECTRA) to be a driver of electrolytic H_2 production, using variables related to the use of fossil resources on final energy consumption. Once again, no relevant link was found with our dependent variable, probably due to the same reasons appointed previously.

Despite the frequent assertion that renewable energy development is a critical factor for the implementation of green H_2, our analysis did not find any statistical significance in the technology variables (EPWPH and EPN). While we acknowledge the importance of renewables in achieving full decarbonization, it appears that this particular interaction may not be a significant factor at the present stage of our research. Many emerging projects in the field of green H_2 do not rely directly on electricity generated from wind or solar sources, but rather on grid electricity injection (IEA, 2022). Nuclear electricity generation was also found not to be statistically significant and presents a negative coefficient

when compared with electrolytic capacity. This fact might be directly related with the absence of a nuclear oriented strategy within Europe and the lack of will considering the viability of nuclear technology can actually have a decent role in electrolysis H_2 production. It is important to state that the UE is still considering nuclear power as green alternative.

The technology variables EPWPH and EPN did not show statistical significance in our analysis. Despite the frequent assertion that renewable energy development is a critical factor for the implementation of green H_2, our findings suggest otherwise at the present stage of our research. Many emerging green H_2 projects do not directly rely on electricity generated from wind or solar sources, but instead utilize grid electricity injection (IEA, 2022). This indicates that the impact of electricity generated from both wind photovoltaic power (EPWPH), may be less influential in the context of electrolytic capacity for green H_2 production.

Furthermore, nuclear electricity generation (EPN) also exhibited a lack of statistical significance and demonstrated a negative correlation with electrolytic capacity. This observation could be attributed to the absence of a nuclear-oriented strategy within Europe and the limited consideration of nuclear technology's viability in electrolysis-based H_2 production. Still, it is important to note that while renewable energy development and nuclear power play significant roles in the broader context of decarbonization, their direct impact on electrolytic capacity for electrolytic H_2 production appears to be less pronounced in the scope of our work.

Finally, our analysis revealed that the environmental indicator (GHGLOG) had no influence on our model estimation. This finding suggests that transitioning towards sustainable pathways requires more than simply having a high-emission country profile. On one hand, it is understandable that a country with high emissions should take responsibility for addressing the issue. However, this alone does not necessarily provide sufficient motivation to adopt cleaner alternatives. Interestingly, even countries that demonstrate a strong commitment to renewable energy still display high CO2 emissions, due to significant reliance on fossil-based resources. This underscores the complexity of the transition towards cleaner options and emphasizes the need for a multi-faceted approach. Simply reducing CO2 emissions is not enough to drive the development of electrolytic capacity and sustainable H_2 production. It requires comprehensive strategies that address not only emissions reduction but also promote renewable energy adoption and the gradual phase-out of fossil fuel dependence.

6. Conclusions

In this study, we examined the factors influencing the development of aggregated electrolytic H_2 production capacity, with a focus on the European context. Through hypothesis testing and analysis of selected variables, we improved the insights into the drivers and barriers associated with the adoption of green H_2 technologies. Electrolytic H_2 production has boomed in last couple of years in Europe and this fact seems to be related with strong strategic and political motivations towards sustainable alternatives of H_2 production. Considering our time span and the cross-sections adopted, our findings highlight the significant role of political proxies, namely the incoming share of environmental taxes and R%D expenditure indicator to explain the variability of electrolytic capacity. These results align with previous studies emphasizing the importance of political support for promoting risky and novel technologies such as green H_2. Socioeconomic factors also seem to play a crucial role in the development of this technology. We found that countries with high energy dependence may face challenges in investing in costly and riskier options like green H_2. Those countries either have a specific energy context or are probably prioritizing renewable energy or other economically viable alternatives over green H_2. Within socioeconomic factors, the energy dependence was the only one variable to show a significance impact on our estimation. The European energy policy framework, particularly its current emphasis on green H_2 investments, together with financial incentives to decarbonisation and H_2 projects

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may explain some of our findings. This is the case for GDP, final energy use, percentage of RES and percentage of nuclear on electricity generation together with CO2 emissions.

It is still important to note that the limited number of observations may be a constraint of our research. For such limited sample, there seems to be no possibility to overcome this constraint for the kind of goal pursued in our work at this time. Notwithstanding, future research will include a larger country sample together with alternative methodologies that we expect to allow for a better insight of the most important drivers on electrolytic H_2 production capacity.

Our work emphasizes the critical role of political support, socioeconomic factors and the need for a multi-faceted approach to achieve sustainable H_2 production. Further research is necessary to expand our understanding of these factors and their interactions to guide future policies and initiatives aimed at accelerating the transition to a more sustainable energy system.

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Appendix

Table A1. Descriptive Statistics of Data, Definition and Sources

Variable	Definition	Source	Obs	Mean	SD	Min	Max
AECLOG	Aggregated Electrolytic Capacity logarithmized **(target variable)**	H2 Project Database (IEA, 2022)	630	-0.7309	2.7312	-4	4.9232
AECLOGLAG	Aggregated Electrolytic Capacity on the previous year (t-1) logarithmized	H2 Project Database (IEA, 2022)	630	-0.9731	2.653728	-4	3.9003
GDP LOG	Gross Domestic Product logarithmized (GDP per head, US $, current prices, current PPPs)	OECD, 2022.	630	4.4875	0.2137	3.7671	5.0787
ED2	Energy Dependence: 0 if below EU average and 1 if above EU average	Eurostat, 2022[1].	630	0.4666	0.4992	0	1
FECIND	Final Energy Consumption of industry as a percentage of the total energy consumption	Eurostat, 2022[2]	630	0.2524	0.0814	0.0808	0.4974
FECTRA	Final Energy Consumption of transport as a percentage of the total energy consumption	Eurostat, 2022[2]	630	0.2824	0.0759	0.0952	0.5377
EPWPH	Electricity Production by Wind and Photovoltaic as a percentage of the total electricity production	Eurostat, 2022[3]	630	0.0617	0.0894	0	0.6094
EPN	Electricity Production by Nuclear powerplants as a percentage of the total electricity production	Eurostat, 2022[3]	630	0.1705	0.2222	0	0.8042
FFFECIND	Fossil Fuel Consumption of industry as a percentage of final energy consumption;	Eurostat, 2022[4]	630	0.5735	0.1712	0	0.9116
FFFECTRA	Fossil Fuel Consumption of transport as a percentage of final energy consumption	Eurostat, 2022[4]	630	0.9601	0.0324	0.7518	1
GHG LOG	Tones per capita of Greenhouse gases logarithmized;	Eurostat, 2022[5]	630	0.9910	0.1544	0.6334	1.4885
ETAX	Environmental taxes as percentage of total taxes revenue (as a proxy for environmental policy)	Eurostat, 2022[6]	630	0.0718	0.0212	0	0.1300
RDE	R&D expenditure as percentage of GDP	Eurostat, 2022[7]	616	0.015148	0.0086	0.0023	0.0387

Source: Authors. Own elaboration.

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Table A2. Correlation Matrix (Part 1)

	AECLOG	AECLOGLAG	ED2	EPN	EPWPH	ETAX	FECIND
AECLOG	1	0.9635	-0.0552	-0.0006	0.4962	-0.3053	0.1422
AECLOGLAG	0.9635	1	-0.0505	-0.0060	0.4902	-0.3173	0.1452
ED2	-0.0552	-0.0505	1	-0.1748	0.1808	0.0091	-0.3084
EPN	-0.0006	-0.0060	-0.1748	1	-0.2393	-0.2814	0.2163
EPWPH	0.4962	0.4902	0.1808	-0.2393	1	-0.0675	-0.2720
ETAX	-0.3053	-0.3173	0.0091	-0.2814	-0.0675	1	-0.0851
FECIND	0.1422	0.1452	-0.3084	0.2163	-0.2720	-0.0851	1
FECTRA	-0.0817	-0.0765	0.4604	-0.2222	0.2789	0.0478	-0.6347
FFFECIND	-0.2968	-0.3030	0.1460	0.0491	0.0352	0.0640	-0.3207
FFFECTRA	-0.4882	-0.4763	0.0983	-0.2691	-0.2601	0.3089	-0.2364
GDPLOG	0.5469	0.5477	0.1494	-0.1543	0.3941	-0.3231	-0.0711
GHGLOG	-0.0386	-0.0316	0.0339	-0.2194	-0.1491	-0.0831	0.1241
RDE	0.5736	0.5747	-0.2095	0.1871	0.2150	-0.3430	0.3625
YEAR	0.5573	0.5445	-0.0041	-0.0687	0.5506	-0.0816	-0.1621

Source: Authors. Own elaboration.

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Table A2. Correlation matrix (Part 2)

	FECTRA	FFFECIND	FFFECTRA	GDPLOG	GHGLOG	RDE	YEAR
AECLOG	-0.0817	-0.2968	-0.4882	0.5469	-0.0386	0.5736	0.5573
AECLOGLAG	-0.0765	-0.3030	-0.4763	0.5477	-0.0316	0.5747	0.5445
ED2	0.4604	0.1460	0.0983	0.1494	0.0339	-0.2095	-0.0041
EPN	-0.2222	0.0491	-0.2691	-0.1543	-0.2194	0.1871	-0.0687
EPWPH	0.2789	0.0352	-0.2601	0.3941	-0.1491	0.2150	0.5506
ETAX	0.0478	0.0640	0.3089	-0.3231	-0.0831	-0.3430	-0.0816
FECIND	-0.6347	-0.3207	-0.2364	-0.0711	0.1241	0.3625	-0.1621
FECTRA	1	0.2679	0.2126	0.2829	0.0793	-0.2841	0.1770
FFFECIND	0.2679	1	0.2523	-0.2837	0.1028	-0.3889	-0.2157
FFFECTRA	0.2126	0.2523	1	-0.3138	0.3245	-0.4407	-0.5499
GDPLOG	0.2829	-0.2837	-0.3138	1	0.4074	0.5586	0.5297
GHGLOG	0.0793	0.1028	0.3245	0.4074	1	0.2440	-0.2471
RDE	-0.2841	-0.3889	-0.4407	0.5586	0.2440	1	0.1606
YEAR	0.1770	-0.2157	-0.5499	0.5297	-0.2471	0.1606	1

Source: Authors. Own elaboration.

References

Ackah, I., & Kizys, R. (2015). Green growth in oil producing African countries: A panel data analysis of renewable energy demand. *Renewable and Sustainable Energy Reviews*, *50*, 1157-1166.

Agyekum, E. B., Nutakor, C., Agwa, A. M., & Kamel, S. (2022). A critical review of renewable H2 production methods: Factors affecting their scale-up and its role in future energy generation. *Membranes*, *12*(2), 173.

Ansari, D., Grinschgl, J., & Pepe, J. M. (2022). Electrolysers for the H2 revolution: Challenges, dependencies, and solutions.

Azhgaliyeva, D., Beirne, J., & Mishra, R. (2023). What matters for private investment in renewable energy?. *Climate Policy*, *23*(1), 71-87.

Bersalli, G., Menanteau, P., & El-Methni, J. (2020). Renewable energy policy effectiveness: A panel data analysis across Europe and Latin America. *Renewable and Sustainable Energy Reviews*, *133*, 110351.

Boulamanti, A., & Moya, J. A. (2017). Energy efficiency and GHG emissions: Prospective scenarios for the Chemical and Petrochemical Industry. *Report 9789279657344, EU Science Hub*.

Bristowe, G., & Smallbone, A. (2021). The key techno-economic and manufacturing drivers for reducing the cost of power-to-gas and a H2-enabled energy system. *H2*, *2*(3), 273-300.

Caglayan, D. G., Heinrichs, H. U., Robinius, M., & Stolten, D. (2021). Robust design of a future 100% renewable european energy supply system with H2 infrastructure. *International Journal of H2 Energy*, *46*(57), 29376-29390.

Chi, J., & Yu, H. (2018). Water electrolysis based on renewable energy for H2 production. *Chinese Journal of Catalysis*, *39*(3), 390-394.

Darmani, A., Arvidsson, N., Hidalgo, A., & Albors, J. (2014). What drives the development of renewable energy technologies? Toward a typology for the systemic drivers. *Renewable and Sustainable Energy Reviews*, *38*, 834-847.

de Oliveira, A. C. L., Tótola, L. A., Lorentz, J. F., e Silva, A. A., de Assis, L. R., dos Santos, V. J., & Calijuri, M. L. (2022). Spatial analysis of energy indicators and proposition of alternative generation sources for the Brazilian territory. *Journal of Cleaner Production*, *356*, 131894.

Egli, F. (2020). Renewable energy investment risk: an investigation of changes over time and the underlying drivers. *Energy Policy*, *140*, 111428.

European Commission (2020). A H2 strategy for a climate-neutral Europe, Communication from the Commission to the European Parliament, the Council, The European Economic and Social Committee and the Committee of the Regions, COM(2020) 301 final. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0301.

Eurostat, 2022[1]. Energy imports dependency Available online: https://ec.europa.eu/eurostat/databrowser/product/view/NRG_IND_ID.

Eurostat, 2022[2]. Complete energy balances. Industry and Transport. Final Energy Consumption. Available online: https://ec.europa.eu/eurostat/databrowser/view/NRG_BAL_C__custom_3995256/default/table.

Eurostat, 2022[3]. Production of electricity and derived heat by type of fuel. Available online: https://ec.europa.eu/eurostat/databrowser/view/NRG_BAL_PEH__custom_68005/default/table?lang=en.

Eurostat, 2022[4]. Share of fuels in final energy consumption. Available online: https://ec.europa.eu/eurostat/databrowser/view/NRG_BAL_PEH__custom_68005/default/table?lang=en.

Eurostat, 2022[5]. Net greenhouse gas emissions. Available online: https://ec.europa.eu/eurostat/databrowser/view/SDG_13_10/default/table.

Eurostat, 2022[6]. Share of environmental taxes in total tax revenues. Available online: https://ec.europa.eu/eurostat/databrowser/view/SDG_17_50/default/table.

Eurostat, 2022[7]. Gross domestic expenditure on R&D by sector. Available online: https://ec.europa.eu/eurostat/databrowser/view/SDG_09_10/default/table.

Fernández, L. J., Herrero, L. A., Campos, F. A., & Centeno, E. (2023). An analysis of the MIBEL green H2 roadmap using mathematical programming. *International Journal of H2 Energy*.

Guerra, O. J., Eichman, J., Kurtz, J., & Hodge, B. M. (2019). Cost competitiveness of electrolytic H2. *Joule*, *3*(10), 2425-2443.

Gulagi, A., Ram, M., Solomon, A. A., Khan, M., & Breyer, C. (2020). Current energy policies and possible transition scenarios adopting renewable energy: A case study for Bangladesh. *Renewable Energy*, *155*, 899-920.

Gürtler, K., Postpischil, R., & Quitzow, R. (2019). The dismantling of renewable energy policies: The cases of Spain and the Czech Republic. *Energy policy*, *133*, 110881.

Holden, E., Linnerud, K., & Rygg, B. J. (2021). A review of dominant sustainable energy narratives. *Renewable and Sustainable Energy Reviews*, *144*, 110955.

IEA (2022). H2 Projects Database. Available from: https://www.iea.org/data-and-statistics/data-product/H2-projects-database.

IEA (2022). H2 Projects Database. Available from: https://www.iea.org/data-and-statistics/data product/H2-projects-database.

IEA[2] (2022), World Energy Investment 2022, IEA, Paris. Available from: https://www.iea.org/reports/world-energy-investment-2022, License: CC BY 4.0.

IRENA (2019). H2: A renewable energy perspective, International Renewable Energy Agency, Abu Dhabi.

Kakoulaki, G., Kougias, I., Taylor, N., Dolci, F., Moya, J., & Jäger-Waldau, A. (2021). Green H2 in Europe–A regional assessment: Substituting existing production with electrolysis powered by renewables. *Energy Conversion and Management*, *228*, 113649.

Kaya, D. (2006). Renewable energy policies in Turkey. *Renewable and Sustainable Energy Reviews*, *10*(2), 152-163.

Khan, K., Su, C. W., Rehman, A. U., & Ullah, R. (2022). Is technological innovation a driver of renewable energy?. *Technology in Society*, *70*, 102044.

Kumar, S. S., & Lim, H. (2022). An overview of water electrolysis technologies for green H2 production. *Energy Reports*, *8*, 13793-13813.

Marques, A. C., & Fuinhas, J. A. (2011). Drivers promoting renewable energy: A dynamic panel approach. *Renewable and sustainable energy reviews*, *15*(3), 1601-1608.

Marques, A. C., Fuinhas, J. A., & Manso, J. R. (2010). Motivations driving renewable energy in European countries: A panel data approach. Energy policy, 38, 6877-6885.

Noussan, M., Raimondi, P. P., Scita, R., & Hafner, M. (2020). The role of green and blue H2 in the energy transition—A technological and geopolitical perspective. *Sustainability*, *13*(1), 298.

OECD (2022). Gross domestic product (GDP): GDP per head, US $, current prices, current PPPs. Available online: https://stats.oecd.org/index.aspx?queryid=60702#.

Olabi, A. G., & Abdelkareem, M. A. (2022). Renewable energy and climate change. *Renewable and Sustainable Energy Reviews*, *158*, 112111.

Olanrewaju, B. T., Olubusoye, O. E., Adenikinju, A., & Akintande, O. J. (2019). A panel data analysis of renewable energy consumption in Africa. *Renewable energy*, *140*, 668-679.

Oliveira, A. M., Beswick, R. R., & Yan, Y. (2021). A green H2 economy for a renewable energy society. *Current Opinion in Chemical Engineering*, *33*, 100701.

Pantaleone, F., & Fazioli, R. (2022). Lock-In Effects on the Energy Sector: Evidence from H2 Patenting Activities. *Energies*, *15*(9), 3006.

Pastore, L. M., Basso, G. L., & de Santoli, M. S. L. (2022). Technical, economic and environmental issues related to electrolysers capacity targets according to the Italian H2 Strategy: A critical analysis. *Renewable and Sustainable Energy Reviews*, *166*, 112685.

Polzin, F., Migendt, M., Täube, F. A., & von Flotow, P. (2015). Public policy influence on renewable energy investments—A panel data study across OECD countries. *Energy policy*, *80*, 98-111.

Przychodzen, W., & Przychodzen, J. (2020). Determinants of renewable energy production in transition economies: A panel data approach. *Energy*, *191*, 116583.

Rabbi, M. F., Popp, J., Máté, D., & Kovács, S. (2022). Energy Security and Energy Transition to Achieve Carbon Neutrality. *Energies*, *15*(21), 8126.

Raman, R., Nair, V. K., Prakash, V., Patwardhan, A., & Nedungadi, P. (2022). Green-H2 research: What have we achieved, and where are we going? Bibliometrics analysis. *Energy Reports*, *8*, 9242-9260.

REPowerEU Plan (2022). Communication from the commission to the European parliament, the European council, the council, the European economic and social committee and the committee of the regions. Available online: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2022%3A230%3AFIN&qid=1653033742483.

Ritchie, H., Roser, M., & Rosado, P. (2020). CO_2 and greenhouse gas emissions. *Our world in data*.

Sachan, A., Sahu, U. K., Pradhan, A. K., & Thomas, R. (2023). Examining the drivers of renewable energy consumption: Evidence from BRICS nations. *Renewable Energy*, *202*, 1402-1411.

Shah, I. H., Hiles, C., & Morley, B. (2018). How do oil prices, macroeconomic factors and policies affect the market for renewable energy?. *Applied energy*, *215*, 87-97.

Sisodia, G. S., Soares, I., & Ferreira, P. (2016). The effect of sample size on European Union's renewable energy investment drivers. *Applied Economics*, *48*(53), 5129-5137.

Solaymani, S. (2021). A review on energy and renewable energy policies in Iran. *Sustainability*, *13*(13), 7328.

Tlili, O., Mansilla, C., Frimat, D., & Perez, Y. (2019). H2 market penetration feasibility assessment: Mobility and natural gas markets in the US, Europe, China and Japan. *International journal of H2 energy*, *44*(31), 16048-16068.

UNFCCC, C. (2015). Paris Agreement, Report of the Conference of the Parties on its Twenty-First Session, Held in Paris from 30 November to 13 December 2015. UNFCCC/CP, 1-32.

Ursua, A., Gandia, L. M., & Sanchis, P. (2011). H2 production from water electrolysis: current status and future trends. *Proceedings of the IEEE*, *100*(2), 410-426.

Van de Graaf, T., Overland, I., Scholten, D., & Westphal, K. (2020). The new oil? The geopolitics and international governance of H2. *Energy Research & Social Science*, *70*, 101667.

Wang, B., Mi, Z., Nistor, I., & Yuan, X. C. (2018). How does H2-based renewable energy change with economic development? Empirical evidence from 32 countries. *International Journal of H2 Energy*, *43*(25), 11629-11638.

Wolf, A., & Zander, N. (2021). Green H2 in Europe: do strategies meet expectations?. *Intereconomics*, *56*(6), 316-323.

Xu, R., Chou, L. C., & Zhang, W. H. (2019). The effect of CO2 emissions and economic performance on H2-based renewable production in 35 European Countries. *International Journal of H2 Energy*, *44*(56), 29418-29425.

Ziolo, M., Filipiak, B. Z., Bąk, I., & Cheba, K. (2019). How to design more sustainable financial systems: The roles of environmental, social, and governance factors in the decision-making process. *Sustainability*, *11*(20), 5604.

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KLADIOLA GJINI[1]

SMEs AND TRADE AFTER COVID 19: UNCERTAINTY FOR ALBANIAN FIRMS

Abstract

The importance of SMEs has been acknowledged from many years now, not only from their dominating position in numbers, but also for their impact in job creation, poverty reduction, and economic growth. Even though international trade is dominated by the operation of large firms, nowadays with the global economy many SMEs are becoming more engaged into global markets. Globalization and especially international trade brings benefits and increases the welfare through lower production costs and prices, the economies of scales and better allocating the resources. The main purpose of this paper is to recognize the role played by SMEs and large firms in the international trade in Albania, as well as to explore the patterns of the Albanian international trade during the 2013-2021 periods. We also want to present some challenges that affected SMEs during and after COVID-19 pandemic. Data are retrieved from the National Institute of Statistics of Albania (INSTAT). By analyzing trade data with enterprises statistics, we can have a better understanding of the impact of SMEs in the trade transactions. This paper can be useful to other researchers in the field who want to compare results from their own countries, as well as highlight the issues that SMEs face in Albania.

Keywords: SMEs, Albania, trade, COVID-19

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1. Introduction

SMEs are considered as *'the backbone of social economic progress'*and also those who bring enormous economic development to the economy (Drucker, 2014). The SME sector has a strategic interest for the economy as a whole due to its importance in the national, regional and, furthermore, global level. Also the SME's attractive and innovative system is widely recognized (Neagu, 2016).

The ability to create new products or services, flexibility and adaptability in a changing market, efficiency in production, and the ability to compete on price and product are some of the main characteristics that SMEs share. In the (UN ESCAP, 2009) do acknowledge that a country's GDP per person is positively correlated with the size of the SME sector. In his paper Eggers(2020) claim that their stature and proximity to other actors contributed to their flexibility (i.e. Stakeholders and customers). SMEs frequently create more jobs, have an impact on investments, provide value, and also increase realized turnover. Other characteristics that SMEs share are presented into the OECD policy and include personnel exchange, cost sharing for marketing, research, and training, as well as the diffusion of technology for greater efficiency improvements (OECD, 2000).

But other researchers as well do not agree with the assertion that the SME sector drives economic growth; Beck et al(2005) believe that there is no empirical evidence that SMEs will automatically lessen

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income disparity or enhance economic growth, UN.ESCAP (2009) acknowledges that SMEs do not possess any *magic power* to reduce poverty.

Liability of smallness is what Freeman (1983) refers to as a liability in terms of the resources the firm has under its control. They contend that having less resources makes one more vulnerable to both internal and external shocks.

The question we want to analyze within this paper is *to what extent SMEs were affected during and after the global pandemic Covid-19 crisis*?

Small and medium-sized businesses have been impacted and faced a challenging situation by the Coronavirus COVID-19's spread, which began in Wuhan (Hubei Province, China) in December 2019 and transferred to other parts of the world. The pandemic lock-downs, and social distancing have affected people and organizations all across the world, by raising serious questions about how government policy responses would affect SMEs, which are the backbone of the global economy and account for more than 90% of all enterprises globally (Tannenbaum, 2020).

SMEs have experienced an unprecedented shock both in the supply and the demand sides. SMEs frequently operate in markets with elastic demand and that lock down policies, employment restrictions, and financial difficulties faced by consumers have all had an impact on the demand side of SMEs (J. Juergensen, 2020). Demand of SMEs has decreased as a result of a loss in consumer confidence followed by the disruption of numerous global value chains, followed by a fall in consumer demand and a loss of confidence. SMEs have experienced labor shortages, logistical problems, transportation disruptions, manpower shortages and numerous other logical problems on the supply side.

J. Juergensen et al (2020) have examined the short- and long-term effects for manufacturing SMEs, which may also vary by company. As they note, SMEs had financial problems and other financial difficulties even before the pandemic, but things got worse following the crisis. Furthermore,J. Juergensen et al (2020) advise among other things to change the global value chains and business models, as well as to increase technology investment. Additionally, they stress the significance of personnel re-training and cost containment through increased innovation.

Financial and liquidity concerns were the main challenges that SMEs faced, and numerous government measures were implemented to solve them (Kalemli-Ozcan, 2020).

The remainder of the paper is structured as followed: in section two we present some effects that Covid-19 pandemic has had on Albanian businesses, in section three we present some economic stimulus packages undertaken by the government, and in section four we make our concluding remarks.

2. COVID-19's Effects on Albanian Businesses

Albania, with a population of 2.84 million inhabitants, an upper middle income country, has many aspirations to get closer to the European Union. Even though the European Union has opened accession negotiations with Albania on the 19th of July 2022, still is considered as one of the poorest countries in Europe, with one of the lowest GDP per capita in the region (UN Country Team, 2020). Compared to other Western Balkan countries, Albania is the second lowest ranked country with a GDP per person (by purchasing power parity) of about 13.192 US dollars, leaving behind only Kosovo (World Bank, 2022).

Furthermore seems not to be fully integrated into regional value chains due to some issues i.e. limited connectivity and/or infrastructure issues. Also, Albania is considered as very exposed to disaster risks

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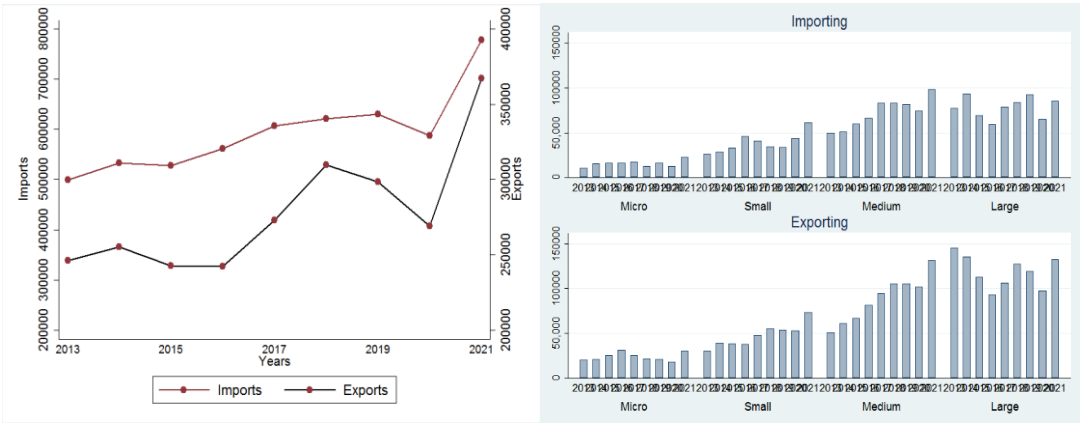
compared to other European countries (Bank World, 2021). During 2009-2019 period Albania had witnessed an economic growth of about 2.4% annual average. Since 2019 the economy was hit by some major economic slowdowns followed by demand, supply and financial shocks due to 1) a weaker power production 2) a severe earthquake and 3) COVID-19 pandemic. Albania's economy recovered in 2021, with GDP growth predicted to be 8.3% due to increased domestic and international demand, as well as an increase in government spending of about 7.6% and investments of about 3.8%. The poverty rate will decline as a result of this economic expansion, returning to its 2019 level of 20.3%. Additionally, due to a significant recovery in tourism and a revival in merchandise exports, the flow of goods and services abroad increased and surpassed the pre-crisis level by 36% (World Bank, 2022). As a pandemic COVID-19 effect in April 2020 exports and imports from and in Albania fell respectively by 44% and by 37% from the previous year. The figure below displays the total amount of exporting and importing for the years 2013 through 2021 by countries, where imports exceed exports consistently, resulting in a negative trade balance. Data was taken from the statistics database of INSTAT Albania. In 2020, exports decreased mostly as a result of COVID-19's effects on trade and the downturn in orders from EU customers. In 2021, we find an increase in imports at around 37 percent and an increase in exports at around 36 percent.

Figure 1. Importing and Exporting (total values and by size)



Source: Author.

According to data from *The Statistics on Small and Medium Enterprises- SMEs*[2]99.8 percent of all businesses are small and medium-sized enterprises, and the remaining 0.2 percent are large businesses. More precisely the breakdown of Albanian firms by size was 93.2% of micro firms, 5.5% of small firms, 1.1% of medium firms and 0.2% of large firms. This indicator appears to have been consistent throughout time even though there was a decline in the MSMEs number from 2017 to 2020 (INSTAT, 2022).

In comparison to 2017, their share of employment in the business sector rose significantly by 3.2 percentage points, with microenterprises producing the most jobs in 2020. MSMEs had the biggest export share in the Western Balkan region, accounting for 64% of exports in 2020, an increase of 4.6% from 2017 (World Bank, 2022).

[2]The European definition classifies those firms with up to 249 employees and with a turnover of 50 million euros in sales, as small and medium sized enterprises. Also in Albania the SMEs definition is based on the Law Nr.10042 date 22.12.2008 for some changes and additions to the Law Nr.8957 date 17.10.2002 "For Small and medium enterprises" is based: i) the employees numbers (firms which do not exceed 250 employees) and 2) the annual value of the balance sheet (firms which do not exceed 250 million ALL)

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SMEs operate in various sectors, in mining and quarrying, manufacturing, construction, wholesale and retail trade, accommodation and food services, transport-information and communication, electricity, gas, water supply, and waste. Lately they presence is more visible in information-technology-communication (ITC) and biotechnology.

The trade sector has the greatest concentration of SMEs. More than 81.9 percent of all workers are employed in the SMEs sector, which also has a 79.7 percent turnover rate.

Data on the total number of businesses, their employees, investments, and value added are shown below.

Table 1. Basic Indicators by Size Class of Enterprises

Size	Enterprises		Employment		Investments		Value added	
	Number	%	Number	%	ALL million	%	ALL million	%
SME	102,405	99.8	412,514	81.9	143,441	74.0	406,554	74.1
Micro	95,558	93.2	186,400	37.0	25,815	13.3	121,554	22.2
Small	5,674	5.5	111,347	22.1	62,475	32.2	142,153	25.9
Medium	1,173	1.1	114,767	22.8	55,151	28.4	142,847	26.0
Large	169	0.2	91,472	18.1	50,438	26.0	142,026	25.9
Total firms	102,574	100	503,986	100	193,880	100	548,580	100

Source: Author.

The Investment Council Secretariat (ICS) and the Ministry of Finance and Economy (MFE) conducted a survey from March 28 to May 5 of 2020 to evaluate how the COVID-19 pandemic affected business activity in Albania. 833 businesses from Albania's 12 counties were surveyed, and 27 percent of the sampled businesses were exporting businesses.

The report's key conclusions (presented also in figures 2,3,4 and 5 are the following: 1) The majority of the companies expected suffering for at least one year 2) Only 53 percent of businesses kept running, and 47 percent completely stopped. 3) A 20 percent decline in annual revenue was predicted by 80 percent of businesses. 4) Some businesses that depend largely on imports from European countries suffered, while others switched to using domestic resources instead of imports. 5) More than 86 percent of businesses were caught off guard without emergency measures or plan (Albania Investment Council, 2020).

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Figure 2-3-4-5.

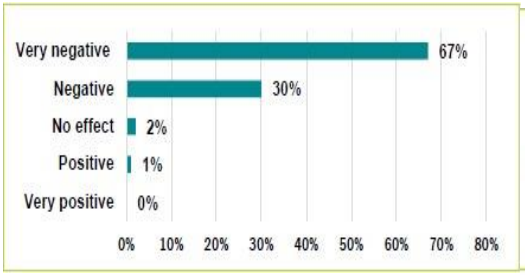

Figure2: Negative impact

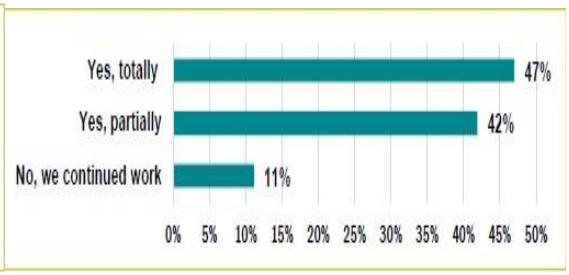

Figure3: Closure of activity

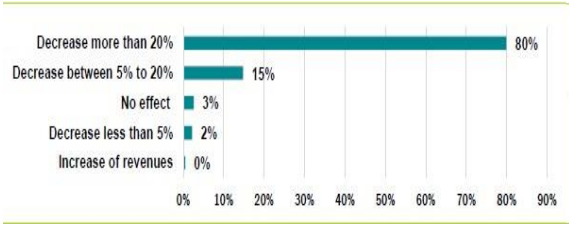

Figure4: Decline in turnover

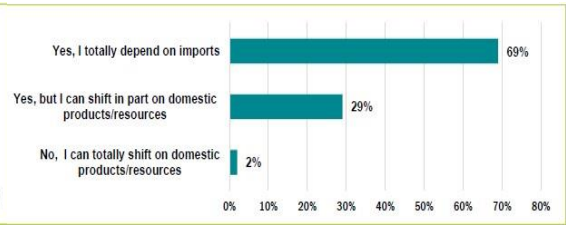

Figure5: Import dependency

Source: Tables are retrieved from the Survey Finding (Council, June 2020).

3. COVID-19 Stimulus Packages

In Wuhan, China, in December 2019, the novel coronavirus COVID-19 pandemic first emerged. It has already caused 625,726,052 cases and 6,558,341 fatalities while spreading quickly over the world as of the 7th of October 2022[3]. Many governments implemented a variety of measures, such as social distancing, lockdowns, restraining human capital, and the temporary shutdown of many businesses, to stop the spread and flatten the contagion curve. All of these crisis measures have demonstrated how businesses and governments should respond to this given context. Response was the first phase for businesses, followed by recovery phase, and "new age" as the third phase where business continuity was the priority.

Due to the COVID-19 pandemic, the trade structure underwent a significant transformation in just one year, which is comparable to a transition that would have taken place in four or five years. Researchers compare the significant decline that occurred during World War II with the decline in trade and output that occurred in 2020–2021.

We must acknowledge that trade performance varied across sectors, with trade in the service industry and travel experiencing a sharp fall. The situation for trade in ICT services, which experienced a boom, was very different. The trading patterns varied even among various products, with pharmaceutical products seeing a sharp increase while steel, vehicles, and fuel saw sharp declines. In their research, Arriola, et al (2021) argue that COVID-19's impact on trade fluctuations in several product categories

[3] Source: https://www.worldometers.info/coronavirus/

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1) was greater than that of the 2008 global financial crisis and 2) is the greatest in the previous two decades.

Additionally, it was challenging for governments because they had to deal with the consequences of their actions or inactions. Their primary goal was to mitigate financial loss. The COVID-19 pandemic was a severe occurrence that forced many governments to deal with the problem of uncertainty on the effects of the best policies to implement. Responses to the pandemic COVID-19 included monetary and fiscal policy, health care, tax payment deferral, financial relief, business loans, leave, and underemployment, and varied among nations. There were challenges with confidence in the government interventions and technical know-how because some of these COVID-19 pandemic strategies were urgent and had a significant degree of uncertainty; occasionally, experts did not agree in their competence due to data (Capano et al, 2020).

Siddik(2020) has developed a multidimensional index "*The index of COVID-19 Economic Stimulus"*[4] (ICES) to examine and standardize different economic responses by governments from country to country. Even though data are limited to only four months, Siddik(2020) finds that factors i.e. beds per capita within hospitals, gross domestic product, median age, total COVID-19 cases, can determine the economic stimulus (demonstrating a significant relation).

Siddik(2020) has gathered monthly data from June to September 2020 for 168 countries including Albania naming the indexes $ICES_1$, $ICES_2$, $ICES_3$, *and ICES4*. His proposed index theoretically takes extreme values between zero and one, respectively meaning *no economic stimulus* and *fully economic stimulus*; divided into three categories a) low response b) medium response and c) high response to COVID-19 according to the ICES values.

[4] He applies the Euclidean distance formula to develop this index, and then through beta regression he identifies the main factors of the economic stimulation of COVID-19.

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Table 3. Country progress to economic policy responses to COVID-19

Country	ICES1			ICES2			ICES3			ICES4		
	Value	St	Rank	Value	St	Rank	Value	St	Rank	Value	St	Rank
Albania	0.176	L	105	0.192	L	93	0.208	L	85	0.208	L	91
Belgium	0.277	M	57	0.255	M	65	0.202	L	88	0.220	L	86
Bosn.Herzg	0.162	L	118	0.150	L	125	0.141	L	145	0.141	L	148
China	0.358	M	14	0.342	M	23	0.345	M	25	0.345	M	27
Croatia	0.485	M	2	0.480	M	2	0.480	M	3	0.502	H	1
France	0.269	M	62	0.246	L	68	0.246	L	68	0.263	M	68
Germany	0.308	M	48	0.304	M	49	0.302	M	52	0.316	M	42
Italy	0.222	L	82	0.258	M	62	0.248	L	66	0.270	M	67
Portugal	0.252	M	68	0.239	L	74	0.239	L	73	0.239	L	79
Spain	0.225	L	81	0.200	L	88	0.205	L	87	0.220	L	87
UK	0.258	M	67	0.245	L	69	0.245	L	69	0.261	L	69

Source: Data are totally retrieved for selected countries from the calculations of Siddik (2020), and 'St' refers to the status; 'L' refers to low; 'M' refers to medium and 'H' refers to high economic response.

Data results show that during the whole period June-September 2020, the economic response from the Albanian government was considered low. According to the indexes we can notice an improvement by lowering the ranking. Furthermore, in June 2020 the response of 70 countries was categorized as medium, and 98 countries response to COVID-19 was categorized as low (Switzerland was ranked 1st). In addition, data on the last index *ICES*$_4$, on September 2020 show that Croatia was ranked in the first position regarding the response to COVID-19, followed by other 75 countries with medium economic response, and other 92 countries with low level of COVID-19 economic response (Siddik, 2020).

During the period from March to June 2020 the Albanian government took some fiscal and monetary measures in order to respond to the COVID-19 pandemic. The Albanian government declared on the 23rd of March 2020 the natural disaster state. Almost 50% of the businesses continued the economic activity regardless to the lock down measures.

On the monetary side, the Bank of Albania decided to lower the base interest rates by 0.5 percent point from 1.0% to 0.5%; and also to lower the borrowing interest rates from 1.9% to 0.9%. Another measure taken was to postpone the payment of the loan installment by six months. This measure is estimated to bring liquidity to people and also enterprises in an estimated value of $ US 150 million.

On the fiscal side, the Albanian government has approved 2 supporting packages for individuals and enterprises with a total value of 45 billion ALL (almost 2.8% of GDP).

Here above, in figure 7 we are presenting the stringency index for Albania by the The Oxford COVID-19 Government Response Tracker (OxCGRT). This index is calculated by using nine metrics i.e schools, workplace and public transport closures; restrictions and cancellations of many public gathering/events and internal movements; lock-down requirements, campaigns for public information and international travel measures.

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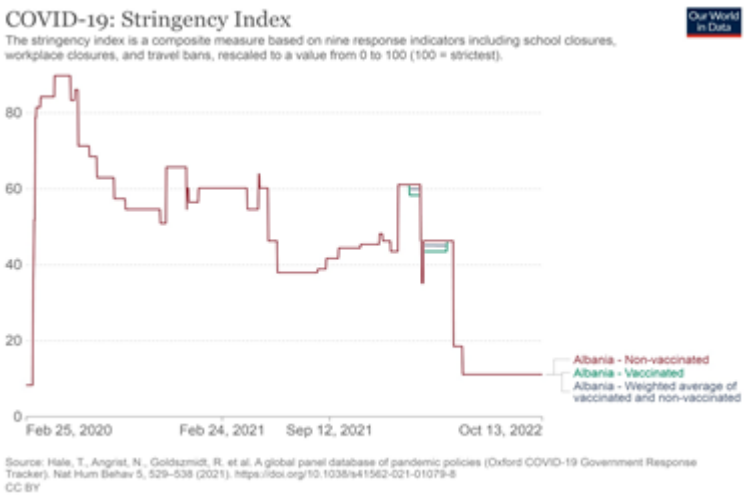
Figure 6. COVID-19: Stringency index for Albania



Source: Author.

Throughout the pandemic, numerous governments introduced programs to support businesses and the nation's economy. They refer to two categories of national government policies, including trade and economic support policies. Many governments included export restrictions, import facilitation, and lowering trade barriers for medical supply in the first category (the trade policy) (Brussevich et al, 2022) (Hale, Angrist, Goldszmidt, Petherick, Phillips, & Tatlow, 2021).

4. Concluding Remarks

COVID-19 pandemic was one of the severe occurrences that forced the Albanian government to deal with the uncertainty problem regarding the best policies to implement. The trading structure changed substantially in just one year, which is equal to a transition that would have occurred in four or five years. As compared to the previous year, both export and import flows decreased. Only half of firms have kept on going since the Albanian government proclaimed a state of natural disaster, and the majority of businesses have forecast a significant reduction in annual sales.

The COVID-19 pandemic affected SMEs in Albania, and they played an important part in crisis response and recovery. First, they adopted a short- and long-term approach to the problem. The impact on the business' operations was assessed by SMEs in the short term, while more complicated issues including financial conditions, the (in)direct impact, and business interruption were examined in the long term. In addition, they needed to confront the crisis and identify fresh development prospects. In the short term, SMEs should concentrate on digitalizing their operations, and in the long term, they should create resilience strategies.

Additionally, the European Commission has recognized Albania's government and Central Bank for their prompt actions in containing the effects of the COVID-19 pandemic and ensuring stability in the country's financial and macroeconomic sectors.

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References

Albania Investment Council. (2020). Survey Findings "Impact of the Corona virus pandemic on the business in Albania.

Arriola, C., Kowalski, P., & van Tongeren, F. (2021). The impact of COVID-19 on directions and structure of international trade.

Bank World. (2021). Assessment of firm's financial resilience against pandemic and disaster shocks in Albania.

Beck, T. A.-K. (2005). SMEs, growth, and poverty: Cross-country evidence. *Journal of economic growth , 10*, 199-229.

Brussevich, M., Papageorgiou, C., & Wibaux, P. (2022). Trade and the covid-19 pandemic: Lessons from french firms.

Capano, G., Howlett, M., Jarvis, D. S., Ramesh, M., & Goyal, N. (2020). Mobilizing policy (in) capacity to fight COVID-19: Understanding variations in state responses. *Policy and Society , 39* (3), 285-308.

Drucker, P. (2014). Innovation and entrepreneurship . *Routledge* .

Eggers, F. (2020). Masters of disasters? Challenges and opportunities for SMEs in times of crisis. . *Journal of business Research* , 199-208.

Freeman, J. C. (1983). The liability of newness: Age dependence in organizational death rates. . *American sociological review* , 692-710.

Hale, T., Angrist, N., Goldszmidt, R. K., Petherick, A., Phillips, T., & Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature human behaviour, 5(4):5 , 5* (4), 529-538.

INSTAT. (2022). Statistics on small and medium enteprises.

J. Juergensen, J. G. (2020). European smes amidst the covid-19 crisis: assessing impact and policy responses. . *Journal of Industrial and Business Economics , 3* (47), 499-510.

Kalemli-Ozcan, S. G. (2020). COVID-19 and SME failures. . *IMF Working Papers* , 207.

Neagu, C. (2016). The importance and role of small and medium-sized businesses. *Theoretical and Applied Economics , 23* (3), 331-338.

OECD. (2000). *Small and medium-sized enterprises: local strength, global reach.* Public Aairs Division.

Siddik, M. N. (2020). Economic stimulus for COVID-19 pandemic and its determinants: evidence from cross-country analysis. . *Heliyon, 6(12), e05634.*

Tannenbaum, C. R. (2020). Small businesses and oil Market shocked by COVID-19, but don't rush reopening. . *Advisor Perspectives.*

UN Country Team, A. (2020). Common country analysis. Internal UN draft, Revised November 2020.

www.mirdec.com CONFERENCE PROCEEDINGS: FULL PAPER SERIES ISBN: **978-605-74781-9-1**

UN ESCAP. (2009). Globalization of production and the competitiveness of small and medium-sized enterprises in asia and the pacic: Trends and prospects.

World Bank. (2022). World bank wdi data.

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RICHA BAGHEL[1]

A STUDY ON FUNCTIONING OF THE SELF-HELP GROUP THROUGH THE AVAILABLE NATURAL FOREST RESOURCES

Abstract

Several literatures justify integration of world-class functioning of the self-help group (SHG) through the available natural forest resources (NTFPs). Researcher referred voluminous authors to avail relevant information and study tribal community, tribal women with specific. To achieve livelihood via NTFPs, with innovation and globalization using IT platform, interventions of traditional knowledge for handmade products by tribal community, backing up with adding value to it and world-class marketing system for sustainability. SHG works precisely way to eradicate the poverty of rural areas and to empower the women. Financial support to the SHG is yet to enhance rural areas' socioeconomic status. It is found in Census 2011 that on an average tribal woman earns 158–150 women-days/year of employment in produces of the forest. There is still an enormous scope for micro commercial activities in the rural regions.

Keywords: Natural forest resource, self-help group

JEL Codes: N50, 013, Q00

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1. Livelihood of Tribal Women of Chhattisgarh

As per IFAD (2014), forest, tree, and agroforestry (FTA) products refer to commodities sourced from a continuum of wild and managed forests, fallows and farmsteads, and distinct trees. The many products sourced from these ecosystems are vital to the livelihoods of around 1.4 billion impoverished people in the world. Participation of tribal in Forest Protection, restoration and development will be emphasized. Similarly, they will be involved in NTFP management in the forest area. Industries will be promoted for an increase in NTFP production and their trade.

Sinha *et al*. (2016) studied that prime livelihood being agriculture; the villagers are able to grow single paddy yield in a year that is the only produce due to of lack of irrigational measures. During the non-agriculture season, men get involved in illegitimate de-forestation or labor work in the urban area of Bastar district. Primarily women get involved to collect and trade of forest collections. Women visit weekly market 'haat' regularly and they know basic marketing means that deliver the basic return for household income in the project area. Based on the willingness of farmers, government support and availability of resources in the research area Tendupatta is managed by forest department so dropped. Mahua is primarily used for making alcohol and sometimes prickle. Mahua prickle doesn't have much demand in the market; also tribal for self-consumption uses Mahua alcohol. One of the possible interventions for Mahua is collective procurement, preservation, and marketing of Mahua Flowers.

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India State of Forest Report (2009) reported that Mahua is usually synonymous with alcohol in the context of tribal life and culture. However, in the Bishunpur block, it was observed that a grass-roots organization was successful in discovering other uses of the mahua collected by tribal communities. Drying of mahua flowers was done at the village level, where three machines for the purpose have been installed by the NGO.The organization called Vanwasi Kalyan Kendra was instrumental in motivating the tribes to sell their collections to local wheat mill owners, who ground the mahua into powder, which was then taken to bakeries to make mahua flavored biscuits. These biscuits were packaged by the organization and sold at fairs organized by institutes like IIM, Ahmedabad. Other products like mahua flavored ice-creams, brahmi snacks, and herbal cosmetics were sold, which enabled, first, to link the tribal communities with larger markets and second, to earn monetary incentives out of the NTFP. Most collectors have been organized into self-help groups of both men and women and are encouraged to take care of their own accounts. Planning Commission (2011) reported that NTFP adds to about 20% to 40% of the yearly income of forest dwellers that are mainly disadvantageous and landless groups with a dominant population of tribes and supports lean season's subsistence. UNEP (2011) reported that most of the NTFPs are gathered and used/sold by women, so it has a resilient linkage to women's monetary empowerment in the forest-fringe parts. Unfortunately, methodologies to develop the rural areas often face negligence in terms of forests as they are falsely observed as being separate than the mainstream of agricultural development. In the present scenario, forest managers are forced to find out new ways and means to increase economic return from per unit area of the forest, to generate increased income in addition to what people are getting now from managing the forest resources in present regime of Joint Forest Management (JFM).

Sunderlin et *al*. (2005) found that poverty in developing countries is the biggest problem and its alleviation is the greatest challenge for all governments. Forest-based poverty alleviation programs specialties the use of forest resources for lessening deprivation of well-being either on temporary or on a lasting basis. Forest can help in poverty mitigation and avoidance by serving as a source of safety nets, subsistence, and gaps in seasonal. Meher (2010) explored the tribal people of Chhattisgarh are losing their sustainable means of subsistence due to the opening of mines and setting up of many mineral-based businesses in the state. Chhattisgarh has 28 variations as major minerals. Despite having 15 to 20 acres of land for every tribal family of the village, none was able to meet its annual subsistence needs from agriculture. The yield rate was very low, just two to three quintals of rice paddy per acre. That too was highly uncertain and subjected to vagaries of the monsoon rain. The extracting and other industries those are captivating over the resources of the ecologies of these tribal people and poor peasants' crashes to provide them with a better and sustainable means of making a livelihood. The very nature of the current development paradigm does not offer for the absorption of these poor individuals into the organized non-farm sector economy by either developing their skills or providing them with technical education.

Mishra (2007), Turton (2000) studied that the households that are faultily hit are those of small, marginal farmers and landless families and those belonging to reserved castes, which also differentiate first. In diversifying into non-farm doings, households simultaneously appeal upon social relations and informal credit systems. The social relations and the traditional provision on caste system continue to serve as an income of support by various means, though these links are failing in many places. Small-scale enterprise, co-operative enterprise, and growth points have all been favored by policy (soft loans, tax breaks etc.) in an attempt to make these income opportunities accessible to lower income groups and to rural areas. It is widely argued now that these distortive policies have acted as a brake on broader economic growth. However, more vulnerable and poor communities would be expected to have more diversified livelihoods. Changes in the external environment can affect assets, activities or outcomes. The resultant changes in behavior are known as coping strategies.

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Arnold (1994) analyzed that it is implicitly known that a large section of the beneficiaries from forest-based activities is not women, not even the tribal or the local people and sometimes people with power and money. The forest-based organizations at the local level rotate mostly around collection and treatment of forest produces and manufacture of items of wood, rattan, bamboo, reeds etc. providing generally to rural requirement. Since the forest area was being diminished and dropping in size, suggestions made that implanting of more trees in the forest. All tribal households are traditionally involved in NTFPs collection. The entire family of tribal household gets engaged to collect seasonal (NTFPs) for income substance. As the season for collection is spread over the entire year for distinctive natural resources, the non-timber forest products collection offers income to the tribes almost throughout the year. In addition, tribes also depend on wage earning (36 %) followed by agriculture (92%), livestock rearing (64 %) and services and allied activities (8 %). In conclusion, NTFPs is the important activity in terms of labor contribution.

Dash *et al*. (2016) studied that the pattern along with the extent of a household collection of NTFP to examines the elements influencing participation of tribal household in forest resource collection vis-a-vis alternate livelihood undertakings. The empirical study finds that the uneducated asset-poor households are more reliant on forest produces than other livelihood approaches available inside the STR. Therefore, a diminishing forest resource base combined with a limited ability to take advantage of other farm and off-farm opportunities keep the poor at risk of further impoverishment.

Hence policy should be directed towards the encouragement of non- forest economic activities that will make the community less forest dependent. Further, the results show that agricultural landholding is inversely related to household dependency on NTFPs.Provision of an alternate source of livelihood to local forest communities by providing adequate cultivable land for agriculture and off-farm employment opportunities may help reduce pressure on forests and improve household incomes.

Alamgir et *al*. (2005), Khan *et al*. (2006) described that the findings highlight the issue of heterogeneity in resource access even among indigenous communities. Therefore, policy and development initiatives should entail focusing on NTFPs in terms of their ability to provide cash income, and the intensity of household use of NTFPs.For instance, emphasizing on the NTFPs that are mostly used for subsistence purpose would help to keep and conserve the stock for forthcoming needs of the forest dwellers. In addition, increasing the efficiency of crop production systems in order to avoid lean times driving people to exploit more resources could reduce the dependency on NTFPs. These measures will coevally improve rural livelihoods and conserve NTFP resources. In addition, improving rural households' access to adequate land could ease environmental pressure from NTFP extraction. Finally, undertaking plans to deliver parallel provision to alternative income generating prospects would reduce pressure on NTFPs and increase the income of forest-adjacent people that would help in poverty alleviation among the forest poor.

2. Livelihood inTervention

Ajaz-ul-Islam et *al*. (2013, 2014, 2015) analyzed that the livelihood progression among tribal community requires a shift of paradigm focusing on forest resources to keep pace with present development and future challenges. There is huge scope to grow of NTFP based livelihoods for the tribal community through suitable adding values, storage, commercialization, systematized global marketing, amendment of indigenous knowledge, developing skills, training support, extension programs, and building networks and exploring latest sustainable forest resources based livelihood avenues. Value addition in sal (Shorea robusta) leaf plate and cup making by installation of household pressing unit and mechanized pressing and molding will generate an employment opportunity of 108792.50 man-days per annum in the study area. The sale of gamhar and teak timber, silk cocoons, lac, bamboo culms, mango fruit (cv. Langra and Mallika), guava fruit (cv. Allahabad Safeda), machine pressed sal leaf plates and

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cups, fuelwood, green forage, tree fodder, minor fruits and agricultural products produced from various livelihood interventions reposed will generate an income of Rs. 327.77 lakhs per annum in the sample villages.

Ajaz-ul-Islam *et al*. (2013), Bhatt *et al*. (2013), Williams *et al*. (2012) described that similarly, either by supporting primary collectors to have access to infrastructure or by creating marketing infrastructure producers can be supported to fulfill gaps and achieve access to remunerative markets. Generally, under these circumstances collective marketing (wherein a combination of accumulation and local value addition performs of no-change-in-form nature) holds important to increase price and support primary producers become market player. The collective marketing strategy can be successfully introduced for all the prominent NTFPs, Adoption of forest-based livelihood activity in central India squarely indicated that forest-based entrepreneurial activity could be undertaken through institutional linkages to reduce poverty among forest-dependent people. The role of institutions in the development delivery system has become an important area of research in recent years.

3. Innovative Plans for Livelihood Development of Women

De (2014) found that ethnographic studies show that non-participation in the operational force in the main sector of the economy is an indicator of social status. With the improvement in economic condition, women workers tend to withdraw from outdoor work in agriculture and allied activities. The younger womenfolk of these families, however, tend to go up for schooling they can join the tertiary sector of the economy or take up more respected livelihoods later on. A decline in the participation rate of women in a growing economy can, therefore, be looked upon as a transitional phenomenon to a certain extent. It would, however, be a mistake to consider all declines in the participation rate as a mark of withdrawal on prestige considerations.

A certain decline is also related to the vanishing or reduction of the sex-specific livelihood roles of women in the kindle of rescheduling the resource use pattern or of an introduction of technical innovations. For a correct appreciation of the dynamics of changes in the participation rates of the tribal female workers in different industrial categories, it would, therefore, be essential to have an idea of the employment traditionally pursued by the tribal populations and of the sex wise partition of labor as associated with these employments. Also in order to realize the true potential of the natural resources in the State, it is important to focus on value-added industries. As a part of the research, to evaluate the level of value adding to medicinal herbs, which is being done in the state, village level administrators of MAPs, members of local community, traders and wholesalers were contacted. It is quite disappointing to note that the information obtained revealed that no attempt of value addition has been done so far to maintain or improve the quality of the plants before the material reaches the industry.

Bhadoriya*et al*. (2011), Kulkarni *et al*. (2008) collectively found that Chhattisgarh should use its strengths as a primarily agrarian economy and a rich in bio-diversity to make more wealth for itself by emerging value-added agro and forest-based trades. The focus should be on cultivation, cotton, sugar, cereals, spices, food processing, gums, oil-seeds and floriculture and on the forest-based industries like sal, tamarind, herb, olive, bran and amla processing industries. The potential for the growth of agro and forest-based industries should be identified in each district of the State. This should be done considering the climatic and the soil conditions. The bio-diversity of the forests must be mapped by the organized classification of the unusual flora and fauna. Jangdey*et al*. (2016) assessed that Chhattisgarh state this is an area of gaps as there are certain gaps that need to be achieved in order to attain value addition of medicinal and other forest resources. Direct value addition is not achieved because of the following reasons: Collection doesn't take place in specific season, Poor harvesting and processing of plant material, Improper grading and sorting.

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Verma *et al*. (2016) critically assessed that Mahua was the major employment source contributing 26.09 % (30 days/HH) to the total NTFPs employment. The collection of Mahua was a labor-intensive activity and time-consuming process. Sal leafs collection were the next important employment generating activity, which provides 24.35 % (28 days/HH) to the total NTFPs employment. The collection of Kendu leafs, Satwaar Zaar, Amla, Rugra, and tamarind contributing 18.26%, 3,48%, 8.70%, 12.17%, and 2.61% respectively to the total NTFPs employment. Thus, based on the employment generating capacity, Mahua and Sal leaves could be considered as the major employment share in the study area. Altogether, the collection of all the available NTFPs generated 115 days of employment per NTFPs collector household.

Behl *et al*. (2002) illustrated that Madhuca Indica is of Indian origin plant developing tremendous remedial and probable use but due to ignorance of people it is not entirely utilized. It is unseen from the vision of the researchers and another botanist. Mahua tree has a lot of pharmacological influence for treatment of several illnesses. An average sized to a large deciduous tree, typically with a short, hole and huge rounded crown created throughout the lush green forest part of India up to a height of 1,200 meters and of 12 to 15-meter height, bark thick dark-colored cracked, inner bark dark red, milk, trunk short, branches numerous. Reddy *et al*. (2013) found that madhuca lagifolia is green in its immature stage and goes orange or reddish yellow once it is fully mature. To extract ripe Mahua from the tree, merely shake the wings and gather the flowers. Seasonality for the fruit is during the months of July and August the flowers from February through April. During the initial winter months, rural residents make a living harvesting the flowers for vending to local distilleries.

The wealth of India, Raw Material, Council of Scientific and Industrial Research Seshagiri*et al*. (2007) described the usage of Madhuca lagifolia and its parts. Patel *et al*. (2015) summarized that mahua oil has been expended as an alternative to cocoa butter and ghee. It is one of the sole largest bases of natural hard fat. The fat that is thus found from Mahua fruit oil is expended in cooking, deep-frying and preparing chocolates. The seed fat has mix property so it mostly extended as emulsifying agents in few pharmaceutical productions. It is generally applied as massage oil in many parts of the country, as it is very good to moisturize skin. The flowers (contains Flower Vitamins A and C), seeds and seed oil of Madhuca have great medicinal value. Superficially, the seed oil massage is very efficient to alleviate pain. In skin infections, the juice of flowers is scrubbed. It is also valuable as a nasya (nasal drops) in viruses of the head due to pitta, like sinusitis. Plants are the significant economical source of well-recognized drugs looking at broad prospects and possibilities of Madhuca Indica for various reasons; it is worthwhile to promote this plant on large scale especially on unfertile and desert.

This will assist in economic support of poor and landless households. Generally, this plant Madhuca Indica is known only for its liquor making purpose, but one has to come forward to change the thinking of unaware people. The Mahua tree is hidden from the public eyes as its medicinal point of view Kureel *et al*. (2009) in table 2.6.1.

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Table 1. Properties of Mahua oil and Mahua seed

SL.NO	PROPORTIES	MAHUA SEED OIL
1.	Refractive index	1.452-1.462
2.	Saponification value	187-197
3.	Iodine value	55-70
4.	Unsaponifiable matter (%)	1-3
5.	Palmitic C 16:0 (%)	24.5
6.	Stearic Acid C 18:0 (%)	22.7
7.	Oleic Acid C C18:0 (%)	37.0
8.	Linolic Acid C18:2 (%)	14.3

SL.NO	CONSTITUENTS	MAHUA FLOWER
1.	Moisture (%)	19.8
2.	Protein (%)	6.37
3.	Fat (%)	0.5
4.	Reducing Sugar (%)	50.62
5.	Total Inverts (%)	54.24
6.	Cane Sugar (%)	3..43
7.	Total Sugar (%)	54.06
8.	Ash (%)	4.36
9.	Calcium (%)	8
10.	Phosphorus (%)	2

Source: Source: Kureel et al. (2009).

Kureel *et al*. (2009) discussed that the nutritional aspects of mahua flower and mahua seed oil. Sunita *et al*. (2013) indicated that mahua tree gives a significantly high quantity of oil. The oil is rich in PUFA and has required a level of oleic and stearic acid to be utilized as a cocoa substitute for confection products and manufacture of margarine, cosmetic and pharmaceutical industries. The mahua oil also has a potential for alternative fuel options for diesel. The flowers are used as a vegetable, for making a cake, liquor etc. mahua is used to cure Bronchitis, Rheumatism, Diabetes, Piles, Eczema, Gums, Burns etc. and flower juice is used in the treatment of various disease and ailments. The seeds are thus valuable in meeting demands for food and food supplements with functional, health-promoting properties in addition to industrial uses. As for the better possible, good quality of mahua tree must be cultivated over plant tissue culture by methods of micropropagation.

The research workers have to come along with the people of the tribal community, so they may have more and valuable knowledge. For upcoming generation, the importance of plant and mahua tree is going to increase due to efficient, availability, comparatively being devoid of toxic effect and mainly lesser cost. Several of pharmacological research is available still it is required to conduct more research on the same. Oil is useful for cosmetics and household usage. Mahua flowers are also expended as vinegar, honey, and jam items. As a liquefied concentrate, the florae may also serve as a sweetener for candy and cakes. Tribes of central India uses the oil from seeds as an alternative to ghee, thus maybe making its moniker, 'butter tree' a term for mahua oil is 'bassia oil'. In its oil form also known as illipe, the fruit is used bakery items. Indigenous technical knowledge (ITKs) defines the people of the Mawlangkhar were using certain ITKs for the preservation of agriculture and natural resource.

Sebastian (2013) examine that the tribes' attitude toward innovation (the use of Mahua oil) and achieving a sustainable business model in entrepreneurship, the target population was people living in the Bastar region. The key finding in this study is that the use of Mahua oil can bring sustainability to the tribes' lives. Sustainability, however, depends on the product, price, promotion, and place. Achieving economic sustainability using Mahua oil effectively requires product quality. The foundation for the effective marketing of Mahua oil is that one must know its product quality and approach it from the right perspective, which involves a clear understanding of the oil and the resulting customer benefits.

This, in turn, involves customer segmentation on the basis of benefits, which many marketing experts feel is the best and most effective manner in which to segment the market. This form of market

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segmentation is considered most effective. Once one tribal family benefits, it can effectively promote its achievements as a way for other families to satisfy their needs. The focus should be always based on the benefits. At the same time tribes who make use of the product must know its strengths and weaknesses, its image, and attraction. For long-lasting economic development, different products derived from Mahua oil must be marketed. Product and price decisions are inseparable because of the importance that buyers place on price in relation to value. Buyers see the price as a reflection of the value received. This means that there is a real opportunity to enhance the product's acceptance with proper pricing. In the case of Mahua oil, during the first stage, price does not matter because the natural resources collected are for their own consumption. However, in the second stage when the product sold to people so that an income can be derived, the price to be set should reflect an understanding of the specific market.

Marketers should keep in mind that the price mix varies at the different stages of the product lifecycle, i.e., at the initiating stage, growth stage, maturity stage, and diminishing stage. While adopting a particular strategy, marketers have a number of alternatives, such as leading the field by keeping prices down, adopting a strategy of niche marketing by differentiating the product from that of the market leaders or selecting a particular segment to which the marketers aim their appeal. Delivery or marketing channels are definite as sets of interdependent administrations involved in the process of creating a product or service accessible for use or consumption. The ultimate objectives of a distribution channel can be summarized as follows: delivering the right quality and quantity of a product, in the right place, at the right time, at the right price, to the right consumer. Distribution is emerging as a critical element of strategic management and as one of the few remaining sources of real competitive advantage.

Apart from influencing costs, increasingly distribution channels also support and enable product differentiation by adding value to the product and by contributing to the total brand experience and projecting powerful images. The main distributions tasks consist in communicate information to the relevant people and provide the necessary arrangements with easy purchase facilities. To provide information on the tribal belt, one must use an effective communication system like notices on market days, mike announcement, and mouth-to-mouth information.

Pallarès-Blanch *et al*. (2015) found that along this line of reasoning, gender-mainstreaming policies should be integrated with rural development policies in order to develop social inclusion in rural development approaches. Since eco-entrepreneurial strategies operate at individual, family, and community level, although small and few, they create projects which are relatively more important in depopulated mountainous areas, like the HPC, than in urban areas. A comparative advantage is identified when eco-entrepreneurs can sell their crafts for the tangible economic values and also the intangible ones associated with the regional ecological capital. Previous experiences of comparative advantage strategies exist, as in the case of a dairy cluster providing a sustainable milk production model in ecological and economic terms during the twentieth century. Despite that, this model is not guaranteed to be sustainable in social terms because of the decrease in the volume of farming. Moreover, some farms replaced commercializing the milk with the Cooperative by producing their own dairy value-added products.

Therefore, new models of collective organization are needed to support these new emerging life strategies and eco-development enterprises while they show much consistency with sustainable development principles and, consequently, they should be at the center stage of the new local development strategy in the new LEADER program. As per World Bank 2004, The global market for Forest Tree Agroforestry produces, assessed at USD50 billion, may offer rural dwellers with inducements to protect trees and forests rather than resorting to deforestation, forest degradation and loss of biodiversity.

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4. Indigenous Knowledge and Handmade Products

Utz *et al*. (2007) investigated that the grassroots innovation networks support efforts where traditional knowledge and innovative products emerge at the individual or collective level. Grassroots innovation plans focus on poverty mitigation based on local indigenous innovation, knowledge, and practices, maintained and largely produced at the grassroots level. In some cases, the value may be added by the formal science and technology sector, but the lead ideas or traditional knowledge emerge at the local level. Although there has been a lot of activity on grassroots innovations, there has not been much assessment or quantification of how they have contributed to improving the livelihoods of people in the informal sector. What little evaluation has been done mostly lists activities and number of innovations? There is virtually no information on costs or impacts of the innovations, though there have been many and some have even been licensed in India and abroad.

A microfinance system which incorporates small and medium-sized enterprises, based on the systematic and scientific harvesting of NTFPs and the increasing manufacture of secondary products from NTFPs may create the opportunity for the forest-dwelling villagers to improve their poor present-day economic conditions. As the market price of value-added products from raw NTFPs is usually higher, the forest dwellers will be able to improve their economic status and simultaneously their dependence on the native forest will be reduced.

Ghoshal (2012) studied that production and marketing of such handicraft products in a formal way, with the intervention of government, authorized bodies, could serve to enhance the financial status of these underprivileged forest fringe communities. Simultaneously, the intention to more sustainably harvest forest products would strengthen. The manufacturing of value-added products (particularly handicraft products) using indigenous knowledge has enormous potential for supporting sustainable livelihoods. Handicraft also supports certain job for rural-urban and nomadic communities via ethnic preservation, tourist attraction leads to foreign exchange thus opens scope for handicrafts fortune in the country. Handicrafts have been a focus of attraction in rural communities and women get engaged in such activities for additional income. Unlike mechanized sector, handicrafts comprise the highest value, easy access to low-cost raw materials, wide entrepreneurship, and depleting simple, local production implements, unrequired latest technology and stops migration.

Din (2014) studied the comparison with industrial makings; crafts could be created by lower income society, as they need labor rather than money. There are about 3500 handicraft items made and the sector creates employment for 60 lakh artisans occupied independently or firms or in small co-operatives. Mwaura (2008) showed that one other aspect of a tradition of particular societies that can help us to sharpen our focus on the role tradition can play in the development process is indigenous knowledge. This term shares a similar meaning with traditional knowledge, local knowledge, traditional environmental knowledge, rural knowledge and so on.

Mosothwane (2007) defined the knowledge that is exclusive to a community that passes from one generation to another through cultural rituals has been the fundamental for agriculture, healthcare education, food preparation, conservation and the wide varieties of other events that withstand a community and its environment in many parts of the world. It can be observed as the complex bodies of know-how, knowledge, practices, and representations for developing people along with long histories of close interface with the natural environment. Indigenous knowledge is local knowledge in the sense that it remains as organized information that remains in the familiar sector of the particular community.

The definition seems to synthesize the elements of other definitions. According to him: Indigenous knowledge (IK) is the knowledge that people in a given community have developed over time and continues to develop. It is right to suppose that building on indigenous knowledge, the basic component

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of any country's knowledge system is the first step to mobilize such capital. The importance of cultural identity and cultural knowledge, it would be realized that it is absurd to think that tradition should be regarded as something to be overcome or jettisoned in the development process. Dada (2016) described that tradition would serve as the means through which the meta-narratives of the mainstream development experts can be deconstructed so as to give voice to societies in their own development. Munang *et al*. (2011) found that ecosystems especially forests and woodlands play an essential service in climate regulation and support for rural livelihoods and food security.

Zoa (2009) said there is increasing recognition of the significance of the indigenous knowledge of people in certain socio-economic and ecological sustainability of natural resources. Rural communities have a significant role to play in maintaining the integrity of these ecosystems to ensure that they continue to support food and water production and other livelihood activities Folke *et al*. (2002) acknowledges of the role of communities as agents of ecosystem services and solidification of their capacity, and empowering them to cope with the ecosystems sustainably is important for the continued working of the ecosystem. NRC 1997 reported the growing awareness of the importance of indigenous knowledge for ecological and socio-economic sustainability. Traditional indigenous knowledge and biodiversity are complementary phenomena vital for human development and sustainable management of resources.

Varte (2012) examined even though very little indigenous knowledge has been documented yet, it represents immense databases that provide humankind with insights on how numerous communities have interacted with their changing environment, including its flora and fauna resources. Lack of acceptance of the importance of tradition, indigenous traditional knowledge, and absence of a sense of participation, responsibility and ownership among local communities has also led to the eventual failure of many well-meaning development interventions.

In a vision of the interrelationship among the natural resource, and its sustainable supervision and the social, economic, cultural, and physical well-being of local people, national and global efforts to implement environmentally comprehensive and sustainable resource management should identify, promote, accommodate and reinforce the role of indigenous people and their traditional knowledge systems.

Munang *et al*. (2011) conducted a study on traditional knowledge in the use and management of forest resources; knowledge resource has been used to improve the livelihoods of the people. Ecosystems, especially forests and woodlands, play an essential service in climate regulation and support for rural livelihoods and food security. Zoa (2009) said that rural communities have a significant role to play in maintaining the integrity of these ecosystems to ensure that they continue to support food and water production and other livelihood activities.

Chaudhury (1993) analyzed that even though very little indigenous knowledge has been documented. Yet, it represents immense databases that provide humankind with insights on how numerous communities have interacted with their changing environment, including its flora and fauna resources. Most environmental and resource management approaches are often formulated without acknowledging local people's culture, knowledge and expertise on the issue, often resulting in the total rejection of such initiatives by the people.

Varte (2012) studied that about lack of acceptance of the importance of tradition, indigenous traditional knowledge, and absence of a sense of participation, responsibility and ownership among local communities has also led to the eventual failure of many well-meaning development interventions. Adopting a social-ecological system perspective that integrates the people-focused rural livelihood

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approach with conservation-focused natural resource management approach, taking cognizance of the traditional knowledge of the people, is needed to ensure ecosystems sustainability.

Robinson *et al*. (2001), Olorunfemi *et al*. (2016) investigated that traditional knowledge is utilized and management of forest resources. How has this knowledge resource been used to improve the livelihoods of the people? Indigenous knowledge is the basis for local-level decision-making in many rural communities. It has significance, not only for the culture in which it develops but also for experts and planners determined to improve situations in rural localities. Anand *et al*. (2005) analyzed that traditional knowledge, innovations, and practices play an important role in practically all aspects of the lives and livelihoods of rural people in India: food and agriculture, human and animal health, clothing, shelter, architecture, art, culture, handicrafts, natural resource management, etc.

Gervais (2008) studied that traditional knowledge is an inseparable part of the bicultural heritage of indigenous and local communities. It is 'tradition' only to the range its creation and use are rooted in the cultural customs and practices of a community; it does not essentially mean static or ancient. Certainly, that 'tradition' can be seen as evolving and dynamic.

Nair *et al*. (2005) Traditional knowledge is generally held collectively. The use of traditional knowledge (TK) related to biological resources is not restricted to the lives and livelihoods of agrarian, rural and indigenous societies. In the modern day, there is an ever-growing demand for natural, herbal and organic products globally, especially in urban markets. The herbal medicine, cosmetics, and personal care industries are the major users of these resources.

Benjamin (2008) conducted a study within the crafts program; profound aids market linkages to the European Union and provide professional assistance, relevant market information, capacity building, contacts and the facilitation of training. If India's crafts are to survive in domestic and international markets, long-term steps need to be taken to establish a positive brand image. In the domestic market, the appreciation for the crafts does not extend much beyond sophisticated urban Indians. Targeted and ongoing campaigns among other levels of society can create new opportunities. In the international market, a 'handmade in India' brand needs to be promoted based on certification and information on the product. Traditionally, rural crafts were sold in periodic bazaars and local spot markets. There are several untapped international market channels such as museum stores, boutique and other niche markets, home furnishing markets, and markets outside Europe and the US.

Liebl *et al*. (2003) studied that on the demand side, rapid globalization and changing domestic preferences have also brought the handicrafts face to face with a unique set of challenges. The problem these industries face is not one of universal unqualified obsolescence in the face of competition from mechanized industries. Rather the problem is that, to survive, old skills need to study, target, and adapt to new buyers and what they want. Where such adaptation has been done with some degree of skill and sophistication, the outcome has been a striking commercial success. But such instances remain scarce in relation to the scale of the industry. Following the recommendations of the Handmade in India report, the World Bank, through its Learning and Research Program on Culture and Poverty, subsequently funded a pilot plan to explore the prospects of new market networks. The overall trend in the domestic market reflects a gradual shift from traditional consumption needs to modern consumption needs.

5. Tribal Women Self-help Group (SHG) Promotion

Awais *et al*. (2009) found that social status of women is a major reflection of the level of social fairness in that society. Women's status is often labeled in terms of their level of earing, education, health, employment, and fertility as well as their positions within the family and the public. In tribal citizens, the role of women is important and vital. Even after mechanization and the resulting commercialization

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swamped the tribal budget, women sustained to play a major role. Mostly women and children do a collection of minor forest produce. A lot of laborers in industries, households, manufacture, contributing to their household income. Despite manipulation by contractors and administrators, tribes are more genuine and honest than non-tribes.

Behera (2016) highlighted that tribal women face glitches and challenges in getting a sustainable employment and a decent life due to environmental decay and the interference of foreigners. The method was taken for the improving status of women, prerequisites betterment, and empowerment. Tribal women have altered themselves to live a customary lifestyle in the native environment and trail employments based on natural assets. Certainly, the programs, oriented towards the empowerment of tribal women, have improved their status and socio-economic conditions. However, there are extensive variations across regions and tribes in terms of work participation, sex ratio, economic productivity and social life. The impact of development planning needs to be evaluated in terms of desired and unanticipated consequences. The development progression should be observed as participation and reorganization method of not only the socio-economic structure but also the whole eco-system.

Gupte (2004) suggested that in order to overcome the traditional cultural barriers of excluding women from public forums, space could be created for women's participation through facilitating tools like the creation of women's SHG, leading separate meetings for women, confirming a critical mass that encourages women to communicate, recruiting women into the field staff, and small-scale income generating activities for women. Muthuramu *et al*. (2015) analyzed that Self Help Group is a recent milestone in the empowerment of women. Since women are a vital part of the Indian economy constituting one- third of the national labor force and a major contributor to the survival of the family, they need to promote and enhance participation on an equal basis with men in social, economic and empowerment process of rural development. Rural women bring income with productive activities ranging from traditional work in fields to working in agro-based industries. The efficient role of SHGs proved through various results of entrepreneurial training as better entrepreneurs and development managers in any kind of human development programs.

Kaur (2015) viewed that the limited number of jobs in government sector and prevailing unemployment problems in India, self-help or self-employment is the best approach for achieving financial freedom and uplifting the social standing of women in the Indian community. Concept of women participation in the environment, forest and biodiversity conservation has been given practical shape through the formation of SHGs in Haryana Forest Department of India.As a result of right approach, the right training and constant follow up, women have become capable enough to realize their strengths, importance of their role in their families in specific and society in overall. This study has revealed that constantly follow up of SHGs can help achieve Million Development Goals set by the United Nations.
Kapila (2015) analyzed that training of rural manpower is considered one of the most important strategies for ensuring sustainable development. However, mostly rural women are underprivileged in comparison to men in their access and abilities to partake in education and training. The successful skill development model should be economical, replicable as well as sustainable; the main objective of the skill development training is to train rural people to bring about improvement in their income that ultimately leads towards better living standards. Ballabh *et al*. (2015) studied both Sadguru and PRADAN are working predominantly with the tribes of central India and have succeeded in the mobilization of the community and in improving their socio-economic status.

Various studies indicate that these interventions have brought on-farm changes with tribal- imbibed by the new technology leading to diversification of crops; development of a healthy financial behavior; increased security of women with a sense of confidence and improvement in their status within the household for instance tribal women who were shy, reticent and under confident, have emerged as leaders and are more articulate having better self-perception and confidence. These interventions have

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also brought about a change in the thought process of the tribes; their increased income generated from various livelihood options is invested in quality education and health of their family members. They are now willing to take up new enterprises and are open to modern technology. It is interesting to understand how these two organizations have succeeded; this is particularly important because literature is replete with examples of the failure of intervention in the tribal area.

Hugar *et al*. (2016) analyzed that forest dependent employments of these tribal families have been unfavorably disturbed due to heavy deforestation and dwindling forest harvest. Certain other challenges confronted were low soil shield; increased regularity of shifting cultivation, heavy soil loss, and high input costs, harms of pests and diseases and limited credit availability. Majority of the families depend upon rain fed agriculture. It was also recognized that the road connectivity and transportation are ruthlessly disturbed during the rainy period for 4-5 months. Patel (2013) found that the various reasons for which the State govt. and the NGOs have taken initiatives for SHG promotion are: realization of the importance of group strategy to meet the credit need of the local people and facilitating inner strength, mobilizing women to deal with direct rural poverty, working to achieve the target of MDGs in achieving gender equality and the free flow of funds from the International organizations, RBI's guideline to the banks for association and importantly, the significance shown by the local public and private banks to offer microcredit to the group and to the individual SHG members.

Among the other reasons for participating in SHGs, getting economic benefits and getting group strength were the most shared reasons in both areas under study. Majority of them said to be motivated by the NGO functionaries, few were being motivated by the peer influence and rests of them were self-motivated. It is to be noted that not even a single respondent was motivated by any government official, which strongly indicate to the negligence shown by concerned the govt. officials in reaching to the remote areas. Along with the economic benefit, dealing with the social issues was mostly shared in the non-tribal respondents as compared to their tribal counterpart. Majority of the members in both the areas were convinced about the importance of regular attendance in meetings. All most all the members who keep regular attendance revealed it help them in frequent social interaction and a better understanding of the SHG process. The common reasons for the members, who were not able to attend, participate and involved in the SHGs expressed about their heavy work burden at the domestic front.

In the aspects like participation, decision making, confidence, networking the changes/improvements are seen comparatively high among tribal women than their non-tribal counterpart. The concept and process of SHGs has greater relevance with Professional Social work practice in terms of the core values, approaches and philosophical foundations. The social work supports with human pride and worth, human moralities, social fairness, and competency. The group approach also helps the people specially the poor and marginalized women in getting justice, self-reliance and inclusiveness by mobilizing their internal strength and social reciprocities. Flourishing trees, farming land and forestry surrounds tribes' zone and prosperity. Women carry a major substance to the tribal economic activities. The traditional knowledge requires indigenous interventions with modern practices. Tribal communes struggle through escalating confronts and encounters, in contradiction of the framework of liberalization. Societal subjugation, discernment, prejudice, scarceness and negligence encountered for tribal have generated in huge parts of the nation a collective situation unidentified to maximum Indians with upper societal status and income. Indian civilization is acutely associated in this. Indian bodies built it, our system continues it, and our people ignore it.

Bhagyalakshmi (2001) reviewed that empowerment is well defined as a method of transformation from self-assertion, and membership and association in developments in an operative sense, to the control over the decision, regarding all aspects of one's life and livelihood. Tribal women are more allied with gathering and extraction of forest resources. Ghosh (2006) described there is a need to consider various wood based and non-wood based activities, their demands on forests and best practices for sustainable

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management and ways to make economic and long term gain through modern management, technology and marketing techniques. Shankar (2015) analyzed participating methods and precise awareness drives is able to achieving amazing results and at the same time preserving the rich traditional practices and sustainability through self-help groups.

In above scenario developing market strategies for tribal women self-help group is essential. To improve the livelihoods of the tribal population by innovative ways of utilization of available forest resources and marketing platform for sustainable marketing model. Economic development is one of the factors that have changed the entire scenario of the social and cultural environment within the country especially for the women. The rural women are engaged in small-scale entrepreneurship program with the help of Self Help Groups. Through these women got empowered monetarily and managing the status of family and community. Women empowerment predominantly for rural women is still an issue. Micro-enterprises in the rural area can support to meet these issues. Panda (2013) found that micro enterprises do not enhance nationwide productivity, create employment but also help to improve economic independency, individual and communal capabilities amongst rural women. Following are some of the personal and social capabilities, which were developed as result of taking up enterprise among rural women.

SHG members create a large number of produces, some of which are compared with branded/market-established produces in a relation of quality. Few produces such as incense, normal and scented candles, soaps, handmade paper, toys, handicrafts, paper mesh articles, wooden furniture, woodcarvings etc. The SHG members are far behindhand in marketing tricks. SHG members are yet to be educated in marketing tricks. The marketing services of the SHG members are far lower in the new benchmarks set by the world, as SHG members are only engaged in direct or one to one marketing activates. They market their products only locally. They don't think of mass production and massive marketing globally. The packaging of the finished products does not attract the form as other industrial products do. The SHGs are not even involved in advertising their produces. They don't like to market their products to unknown persons. They target only known people, relatives and other SHG members as their customers. They don't try to market their products through the nearby shops.

Gandhi *et al*. (2013) analysed that even some SHG women indulge in the door-to-door marketing of their products. This provides less scope of sales and they end with lesser profits. As the SHGs are now slowly entering the market section, they can only be late followers of pioneering strategies. But in course of time if they innovate they can also become pioneers. They can make use of their regional benefit to explore for product differentiation and can achieve in the world as best competitors of global products. Earlier in 1965, Olson studies that smaller user groups are more expected to cooperate with each other. Behera (2009) made the main argument is that free riding can more easily be overcome in a small group compared to a large one, as peer monitoring is easier in small groups, while shared norms and patterns of reciprocity in such groups compel users to consider the indirect and long term consequences of their action. It is argued that effective rules are less likely to be sustainable when the group size is large. However, some empirical studies on this issue have given a contradictory result. In an interesting study on India by Heltberg (2001) found that larger villages are more likely to have active management institutions. However, the author could not give a convincing explanation for this phenomenon. Hobley *et al*. (1996) studied piloted in community forest administration in Nepal also realized that bigger groups were no less effective than minor groups.

The researchers argued that a well-represented and highly factionalized and the managed bigger group might be more active than a non-factionalized but non-representative, poorly managed a small group. Baland *et al*. (1999) illustrated that the influence of groups' size on the joint provision of public properties that shows that bigger groups that share mutual models and are faced by common challenges may be successful. There might be positive economies of scale in bigger groups in the substances of

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pooling resources and distributing risk. Analysis makes it clear that group size is one of the key factors affecting resource management outcomes and that the effect is conceptually ambiguous. In India, (NABARD) National Bank for Agriculture and Rural Development supported SHG-Bank linked programs, where micro finance programs are rapidly growing in the world covering 97 million poor households as on 31st March 2011.

Lokhande (2013) focused thaton the contribution of micro finance o the socio-economic empowerment of women group members. It was found that NABARD's involvement along with the help of NGOs energetic young members of the groups them contributory in leading their groups in the right direction. It was noticed that the earnings of these respondents (Maharashtra rural women) (total number of groups available 2180 and referred 10% i.e. 218 women groups) were uncertain and irregular. Intervention was entrepreneurship development programs/ skill development programs. After the union, the groups, the monthly average revenue and savings of the respondents had shown upturn from 76.27 percent to by 133.73 percent.

Even their political participation showed increased confidence and responsibility level. He concluded that, there is need of employing long term policy measures to empower women in its true sense. Some key issues such as training, awareness and viability of the group activities need to be addressed in order to strengthen women empowerment process through micro financing. Ningshen *et al*. (2013) aimed their study towards evaluate the women's SHGs under IFAD encouragement in Ukhrul District, Manipur State, India. The International Fund for Agricultural Development (IFAD), skill up gradation trainings in weaving various kinds of workshop, fruits and food processing and entrepreneurship development program were taken up by the IFAD in strengthening the SHGs. In every six months' cyclic assessment of the group was made as per the valuation format prepared by NABARD and funds were assigned to them, according to their functioning.

Weaker groups were identified and further capacity building or facilitation was done for improving the group performance. The research groups were thoroughly armed on SHG concept. The ultimate goals of the District for SHG movement were worked out in detail and the same was shared with the members. The poorest of the poor within the villages was covered in the first phase. Later on, the villagers armed themselves and the IFAD assisted them on capacity building. The support provided by IFAD in encouraging SHGs included monetary assistance, technical support, training and human resources. Income is the major element of the standard of living of the citizens. Dewangan (2013) studied that the revenue of the SHG members has improved after uniting the SHGs. It is observed that before joining SHGs, 60 percent of the members had a monthly income of less than Rs, 1000/- and 37 percent of members had an income of Rs, 1000 to 2000/-, whereas two percent of members had an income of Rs, 2000 to 3000/- per month. After joining SHGs, 53.33 per cent of the members had a monthly income of Rs, 1000 to 2000/- and 30 per cent of members had an income of Rs, 2000 to 3000 per month, while 16.67 percent of members had a monthly income of Rs, 3000 to 4000. It is clear that there has been a substantial increase in the income levels of members, in the lower income bracket, as well as in the middle and upper-income bracket, after the members joined the SHGs.

With an increased income, the members of the SHGs are independent to meet their personal expenditure, besides contributing to their household income. Livelihood in the interface of two different perceptions, a livelihood-oriented investigation means examining and blending two different perceptions of a livelihood system and the embedded livelihood strategy: The perceptions of the outside observers, such as researchers or development agents and; The perceptions of the insiders concerned, that is, the members of the livelihood system approached by the investigator. Obviously, the two perceptions might project different realities. These may have to be negotiated and clarified before they become the facts and figures informing a planning process.

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6. Information Communication and Technology

Christensen *al*. (1997) studied that the advertisement of rural off-farm enterprises is observed as the potential to absorb to excess on-farm labor, stimulate rural growth and overcome their poverty. Dave *et al*. (2010) studied it could accumulate opinions from few representatives' respondents of facilitating organizations i.e. banks, government agencies and important NGOs working in the area undertaken for the study. Based on these interactions and input from rural producers following strategic framework is designed to upgrade the status of these producers and increase their prospects in the longer run. Technological and skill up gradation, market, and credit facilitation were the major suggestions were proposed based on opinions of different stakeholders and researchers to improve the current situation of rural producers.

Brands have been developed at the product level and/ or the retail store level like FabIndia and Mrignaynee or at only the product level like Khadi. Some brands like Ethicus a 100% organic cotton handicraft apparel and furnishing brands, has put a picture of the artisan who created the product with the time taken to make the product on the label, which helps consumers connect to the talent and time involved in creating a handmade product. FabIndia's success story in marketing the diverse crafts of Indian textiles especially in the apparel and home furnishing segment should not only remain a Harvard Business Case study but should be applied to both Government and Non-Government organizations that market handicrafts today.

Mother Earth a brand of domestic retail chain stores by Industries Crafts is a social brand for the natural and handcrafted product with a primary aim to provide employment to rural artisans and rural workers. Mother Earth has three key sub branded product lines under the Mother Earth Umbrella, which is Earth Fashion for Apparel, Earth Home for Home textiles and home d-cor products and Earth Food for natural organic food grain and related products. Industrial crafts are a blend of a for-profit commercial retail that delivers marketing knowledge and support through traditional non-governmental organizations to provide training in skills and capacity building.

'Ethnic chic' is the trend in clothing and housewares design, which seeks to incorporate ethically different patterns, designs and colors into the dominant cultural fashions. Ethnic branding is essential to the popularity of ethnic chic. Second, following Hendrickson (1996) and Nakatani (2001) studied that deconstruct the images and texts in terms of notions of 'traditional', 'natural' and 'authentic'. Underlying the study and its interpretation is the impulse of the commodification of scarcity. The study has set out to test whether 'ethnic branding' is an important marketing feature of Asian crafts and whether the images and texts employ notions of 'traditional', 'natural' and 'authentic'. This was significant in that we supposedly live in a more globalized, 'politically correct' and 'aware consumer' world. By and large, in the three websites and catalogues analyzed, Asian peoples are essentialized and homogenized and their unique cultures commercialized and commoditized for the sake of better sales.
Gaur *et al*. (2015) studied that the best results arrived from the utilization of online platform to sell traditionally and create a strong market network. This supported rural artisan to avail payments through the same online portal or bank transactions. It will lead to empower rural artisan and connect them with the globe. In addition, ICT4D projects involve multiple actors from public and private domains. Therefore, establishing effective multiple partnerships with various stakeholders and providing a strong value proposition combined with low margins is desirable.

7. Marketing and Value Addition

The marketing mechanism of almost all the NTFPs is predominantly individual oriented and the majority of the NTFPs are sold in the raw form without any value addition except certain trivial functions fetching paltry income to the vendors. Individual sales mechanism is lesser surplus for forest

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resources that restricts the collectors to approach the remunerative markets that require tradable quantity. The NTFPs marketplaces are by and large imperfect and the local people do not get a fair return for their effort. The poor marketing substructure and lack of storage amenities compel them to sell their products to the first market interaction that is usually the haat or the petty trader.

The selling of almost all the forest resources is predominantly done in the local weekly markets where the transaction takes place at a mutually agreed price quote between petty traders and vendors. Generally, the forest produces hit the market during the peak season where getting a better price becomes difficult due to the competitive market situation. The middlemen regularly exploit forest resource collectors of NTFPs on account of prevailing misconducts distressed and forced sales. Singhet*et al*. (2011) and Salim *et al*. (2011) illustrated that introduction of collective marketing strategy, increasing trading period by proper storage, value-added measures and creation of marketing infrastructures can help the NTFPs collectors to fulfill the gap and get better prices for their forest produces. The findings are not unusual and a significant number of studies across the world have demonstrated the dependence of forest dwellers on non-timber forest products.

Kumari (2000) studied that emancipation of women does not stop with economic independence alone. The performance and productivity of any person depend upon several factors. Very important among them is the technical knowledge for performing a particular job. This holds good even for women in agriculture. To ensure better participation, such training should be conducted at village level since women are engaged equally in the domestic sector also. Eradication of poverty of India women would not be accomplished through anti-poverty programs only, it will require their democratic contribution and changes in the economic structure in order to ensure their access to resources. There is a need for action-oriented Research and Development in areas of developing new, alternative marketability, particularly for low value and high volume NTFPs on the basis of post harvesting, semi-processing, genetics, nursery plantation, collection, storage, chemical analysis and extraction management. Studies show that trade in NTFPs is also very diverse. Different systems exist in different states and even bartering systems still exists. Dogra (2012) found that sufficient information on market intelligence on NTFPs is not available. Mahua seed and flower Suggestive list of Potential NTFPs, others are Tendu leaf, Sal leaves, Chironji, Lac, Tamarind, Sabai grass, Kalmegh, Mahua seed and flower, Sal seeds, Siali leaves, Anola, Kullu gum, Hill broom grass, Salai gum, Litsea glutinosa (Maida bark), Arrowroot (Curcuma angustifolia), Rauvolfia serpentine, Honey, Tassar, Bamboo.

Financial institutes at currently provide credit to the exporters and processors of NTFP, and these capitals get used mainly for purchasing and marketing and not for sustainably managing and harvesting the resource. Therefore, establishing an institutional arrangement for access to credit is required. Moreover, boosted awareness on the possibilities and prospects of NTFP related developments, mainly among the politicians, banks, policy developers and development institutions are required for right policy formulation. NTFPs certification is quite challenging since the specification of NTFP certification in contrast with cultivated and timber products are not yet properly analyzed and documented. However, with the globalization, the export of NTFPs is registering a sharp increase. Certification will help in getting better price abroad and sustainability of the resource back at home. Now certification of some of the NTFP products in the major exporting nations has been found a successful tool for export publicity.

Nayak *et al*. (2013) studied the distinguished cases are Shea butter in Ghana, Brazil nuts in Bolivia, and Devils claw in Namibia. Forests offer a range of marketable NTFPs like tubers, resins, honey, fruits, flowers, leaves, berries, creepers etc. that has great nutritional, medicinal, and other useful values. However, many of these products fetch a good price in cities and market but the collectors (the forest-dependent) sale these to the intermediaries at abysmally lower prices. Shukla *et al*. (2015) clearly indicated that Mahua are sold by most of the people (97%) and it adds the maximum share of income

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for the Tribal. On the other hand, only 2% people cultivate Kosa. Mahua is mainly used to manufacture alcohol and occasionally prickle. Mahua prickle doesn't have much demand in the market; also tribal for self-consumption uses Mahua alcohol. One of the possible interventions for Mahua is collective procurement, preservation, and marketing of Mahua Flowers.

Other estimates suggest that up to 35 percent of the income of tribal households in India comes from the collection of unprocessed NTFPs. Tewari and Campbell (1995) studied small-scale forest-based organizations, many of them built on NTFPs, could provide up to 50 percent of revenue for 20 to 30 percent of the rural workforce in India. In order to encourage better management of the dry-deciduous forest areas of this region and to reduce forest dwellers' dependence on timber products for subsistence purposes, initiatives are urgently needed to support the manufacturing and marketing of value-added products. Ghosal (2012) studied that the manufacturing of value-added products (particularly handicraft products) using indigenous knowledge has enormous potential for supporting sustainable livelihoods. The indigenous knowledge of tribal communities "which are historically related to Indian traditions as a whole" is very much apparent in these handicraft products. Such kinds of products not only enrich our knowledge about forest-based traditional Indian culture but also reveal the historical evolution of Indian art and crafts over time.

Shukla *et al*. (2015) studied that extending the work area may develop a broader picture of forest marketing, to all the marketing of forest produce of Chhattisgarh Organizations Plants across different regions and maybe country as a whole. Collaborating with private enterprise to streamline processes including licenses, improving the marketing of forest produce of Chhattisgarh state and raw product. Coordinating and supporting international collaboration with other international marketing of forest produce of Chhattisgarh state. According to Aziz (2006) in India entrepreneurs first emerged in the rural areas. They were mostly traditional artists, cultivators, and entrepreneurs engaged in distribution and production of goods and services essential by the people. Entrepreneurship has become a key strategy for rural development. Hence, a better understanding of the association between entrepreneurship and rural growth is essential. The nature of entrepreneurship in rural India has been reduced by problems like inflexible caste structure, poor infrastructure and lack of training in last many years. Even then, there was a sub-current of petty entrepreneurship for a long period.

Kashyap *et al*. (2006) described that rural households in developing countries typically obtain 30-45 percent of their total rural income from off-farm sources. The present study is confined to the non-farm sector and focuses more on problems of rural producers such as artisans and craftsmen. These creators have not been able to advance their economic situations due to lack of education, slow adaptableness, unavailability of raw material, poor quality and productivity, and lack of market intelligence, poor managerial skills and many more to add. Craftsmen also lack indulgent of the demand in the local area, market channel and dynamics, price variation, and value addition potentials, which can help them to develop a comprehensive intermediation, plan related market realities.

Taori *et al*. (1995) found that rural firm's progress is constrained by a number of aspects, and poor access to commercialized markets, including the narrow scope of local demand, low density. These things consequentially followed by lack of opportunity for networking, inadequate access and lack of awareness of modern information technology along with problems in accessing capital. The accomplishment of rural industries crucially dangles on two major roles i.e. effectual marketing and resource generation including finance. Besides this, more production orientation is a common misconception and cause of flops of some entrepreneurship determinations. Marketing involves everything that could be important to remain and lead the market. It also involves constant interaction with all relevant stakeholders. It is crucial both types of rural businesses i.e. Farm Sector and Non-Farm Sector.

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8. Conclusions

It can be concluded that major problems, which are affecting rural economy and market, are large manufactures with huge research and development capacity. Lack of assistance provided in value addition and technical up gradation. They are unaware of potential new markets in India and abroad. Their means of access to these gaps markets is severely limited. Craftspersons suffer greatly from lack of accessible credit and loan facilities. This might be due to lack of information on facilities and credit procedures, lack of properties to serve as collateral, the necessity of having a 'contact man' in the bank etc. Major issues also involve, civic infrastructure is added hurdle, poor condition of roads and electricity, lack of transportation. Professional infrastructure likes work sheds, shipping; storage and packing facilities and social service infrastructure like insurance, medical care etc. is in addition to these issues. The literature has tried to detect certain key problems of rural marketing one of the very vital parameter of rural development and growth.

References

Agarwal, B. (1997). "Bargaining" and gender relations: Within and beyond the household. *Feminist Economics. 3*(1): 1 –51.

Agrawal, A., Yadama, G., Andrade, R., & Bhattacharya, A. (2006). Decentralization and environmental conservation: Gender effects from participation in joint forest management (CAPRi Working Paper No. 53). Washington, USA: CGIAR Systemwide Program on Collective Action and Property Rights (CAPRi).

Agrawal, S. C., & Pati, R. N. (Eds.). (2010). Folk Medicine, Folk Healers and Medicinal Plants of Chhattisgarh. Delhi, India: Sarup Book Publishers PVT. Limited.

Ahirwar, R. K. (2015). Indigenous knowledge of traditional magicoreligious beliefs plants of district Anuppur, Madhya Pradesh India. American Journal of Ethnomedicine. 2(2): 103 —109.

Ajaz-ul-Islam, M., Sulaiman Quli, S. M., Rai, R., & Sofi, P. A. (2013). Livelihood contributions of forest resources to the tribal communities of Jharkhand. Indian Journal of Fundamental and Applied Life Science. 3(2): 131 –144.

Akshatha, K. N., Mahadeva Murthy, S., & Lakshmi Devi, N. (2013). Ethnomedical uses of madhuca longifolia--a review. International Journal of Life Science and Pharma Research. 3(1): 44 –53.

Alamgir, M., Jashimuddin, M., & Bhuiyan, M. A. R. (2005). Employment generation and economics of cane-based furniture enterprises of Chittagong, Bangladesh. Journal of Bamboo and Rattan. 4(3): 279 – 291.

Anand, M., Sahay, B. S., & Saha, S. (2005). Balanced scorecard in Indian companies. Vikalpa. 30(2): 11 –26.

Angelsen, A., & Wunder, S. (2003). Exploring the forest–poverty link: Key concepts, issues and research implications (No. CIFOR Occasional Paper no. 40, pp. viii-58p). CIFOR, Bogor, Indonesia.

Arnold, J. E. M., Liedhilm, C., Mead, D., & Townson, I. M. (1994). Structure and growth of small enterprises in the forest sector in southern and eastern Africa.

Awias, M. and Alam,T. and Asif,M. (2009). Socio-economic empowerment of tribal women and Indian perspective. International Journal of Rural Studies. 16(5): 1 –11.

Aziz A. (2006), Rural Entrepreneurship: Opportunities, Challenges and Responses, keynote address by the author as the chief guest in the national seminar on rural entrepreneurship.

Baland, J. M., & Platteau, J. P. (1999). The ambiguous impact of inequality on local resource management. World Development. 27(5): 773 –788.

Ballabh, V., & Batra, P. (2015). Socio-Economic Transformation of the Tribals in Central India: Lessons and Experiences. Indian Journal of Agricultural Economics. 70(3): 272 –283.

Banerji, R., & Mitra, R. (1996). Mahua (Madhuca species): Uses and potential in India. Journal of Applied Botany and Food Quality. Abstract 16: 260-277.

Behera, B. (2009). Explaining the performance of state–community joint forest management in India. Ecological Economics. 69(1): 177 –185.

Behera, J. K. (2016). Economic status and development of tribal women: An analytical study. Eastern Anthropologist. 69(2): 2 –3.

Behl, P.N., & Sriwasrawa, G.S. (2002). Herbs useful in dermatological therapy. CBS Publishers and Distributors, New Delhi. 2: 94 –95.

Benjamin, W. (2008). The work of art in the age of its technological reproducibility, and other writings on media.

Berry, B. T., Ghosh, A. K., Kumar, D. V., Spodick, D. A., & Roy-Burman, P. R. A. D. I. P. (1988). Structure and function of endogenous feline leukemia virus long terminal repeats and adjoining regions. Journal of virology. 62(10): 3631-3641.

Bhadoriya, S. S., Ganeshpurkar, A., Narwaria, J., Rai, G., & Jain, A. P. (2011). Tamarindus indica: extent of explored potential. Pharmacognosy Reviews. 5(9): 73-81. Bhagyalakshmi, J. (2001). Presenting Educational Science: What next?". Yojana. 45(9): 48 –49.

Bhatt, P. C., Ahmad, M., & Panda, B. P. (2013). Enhanced bioaccumulation of astaxanthin in Phaffia rhodozyma by utilising low-cost agro products as fermentation substrate. Biocatalysis and Agricultural Biotechnology. 2(1): 58 –63.

Byron, N., & Arnold, M. (1999). What futures for the people of the tropical forests?. World development. 27(5): 789 –805.

Census of India – 2001. New Delhi: Office of the Registrar General and Census Commissioner, Government of India.

Census of India – 2011. New Delhi: Office of the Registrar General and Census Commissioner, Government of India.

Chakraborty, P., Tewari, H.R., & Jha, M. K. (2009). Sustainable rural livelihoods through participatory natural resource management: A case study. Journal of Rural Development. 28(1): 85 –100.

Chamberlain, J. L., Bush, R. J., Hammett, A. L., & Araman, P. A. (2000). Managing national forests of the eastern United States for non-timber forest products. In Proceedings, XXI IUFRO World Congress 2000. Forests and Society: The Role of Research. 1: 407 –420.

Chamberlain, J., Bush, R., & Hammett, A. L. (1998). Non-timber forest products. Forest Products Journal. 48(10): 10 –19.

Chaudhuri, S. (1993). Dunkel draft on drug patents: Background and implications. Economic and Political Weekly. 28(36): 1861 –1865.

Chhattisgarh Environment Conservation Board, Assesment report 2011.

Christensen, G., & Lacroix, R. L. (1997). Competitiveness and employment: A framework for rural development in Poland(No. 383). World Bank Publications.

Cornwall, A. (2003). Whose voices? Whose choices? Reflections on gender and participatory development. World Development. 31(8): 1325 –1342.

Dada, S. O. (2016). Resolving the Crisis of Development in Africa. International Journal of Humanities and Cultural Studies. 2(4): 502 –518.

Das, B. K. (2005). Role of NTFPs among forest villagers in a protected area of West Bengal. Journal of Human Ecology. 18(2): 129 –136.

Dash, M., & Behera, B. (2016). Determinants of household collection of non-timber forest products (NTFPs) and alternative livelihood activities in Similipal Tiger Reserve, India. Forest Policy and Economics. 7(3): 215 –228.

Dave, K., & Saxena, K. (2010,). Problems and Prospects for Marketing of Rural Products: An Empirical Study of Tribal Region of Rajasthan (India). Oxford Business and Economics Conference.

De, D. (2014). Nehruvian vision of sustainable development for tribals in India: A critique. South Asia Research. 34(1): 1 –18.

Dhingra, R., Kumar, A., & Kour, M. (2009). Knowledge and practices related to menstruation among tribal (Gujjar) adolescent girls. Studies on Ethno-Medicine. 3(1): 43 –48.

Din, T. M. U. (2014). Handicraft Production and Employment in Indian: An Economic Analysis. Global Journal of Human-Social Science Research. 14(4): 8 –30.

Dogra, R. K. (2012) Networking Project on Non-Timber Forest Products. National Project Director, Forestry Education, ICFRE. (Concept Note).

Ekka, A. (2012). Some interesting alcoholic beverages among the tribal communities in Chhattisgarh, India. International Journal of Pharmaceutical Research and Bio-Science. 1(4): 353—359.

Ellis, F. 1998. Livelihood Diversification and Sustainable Rural Livelihoods.

FAO, C. IFAD (2014) Youth and agriculture: Key challenges and concrete solutions. Rome: Food and Agriculture Organization Publications.

Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., & Walker, B. (2002). Resilience and sustainable development: building adaptive capacity in a world of transformations. AMBIO: A journal of the Human Environment. 31(5): 437 –440.

FSI (Forest Survey of India) (1997). The State of Forest Report 1997, Ministry of Environment and Forests. Dehra Dun, India: Forest Survey of India.

FSI (Forest Survey of India) (2011). The State of Forest Report 2011, Ministry of Environment and Forests. Dehra Dun, India: Forest Survey of India.

Gandhi, K., & Udayakumari, N. (2013). Marketing strategies of women self help groups. International Journal of Current Research and Academic Review. 1(2): 117 –122.

Gaur, A., & Avison, D. (2015) Women and ICT-enabled well-being: Inclusive innovation by micro financial institutions in India. Proceedings of the 13th International Conference on Social Implications of Computers in Developing Countries. Negombo, Sri Lanka.

Gervais, D. (2008). Traditional Knowledge: Are We Closer to the Answer (s)-The Potential Role of Geographical Indications. ILSA Journal of International and Comparative Law. 15(2): 551 –564.

Ghosal, S. (2011). Importance of non-timber forest products in native household economy. Journal of Geography and Regional planning. 4(3): 159 –168.

Ghosh, N. (2006). Theory and practice of agricultural indicators. Economic and Political Weekly. 41(34): 3703 –3705.

Ghosh, N. (2014). An assessment of the extent of food processing in various food sub-sectors. Delhi, India: Institute of Economic Growth.

Gubbi, S., & MacMillan, D. C. (2008). Can non-timber forest products solve livelihood problems? A case study from Periyar Tiger Reserve, India. Oryx—The International Journal of Conservation. 42(2): 222 –228.

Guijt, I., & Shah, M. K. (1998). The Myth of Community: Gender Issues in Participatory Development. London, UK: Intermediate Technology.

Gupta, R., Banerji, P., & Gulcria, A. (1982). Tribal Unrest and Forestry Management in Bihar, Indian Institute of Management. Ahmedabad. CMA Monograph, (98). 88.

Gupte, M. (2004). Participation in a gendered environment: The case of community forestry in India. Human Ecology. 32(3): 365 –382.

Haverhals, M., Ingram, V., Elias, M., Sijapati Basnett, B., & Petersen, S. (2016). Exploring gender and forest, tree and agroforestry value chains: Evidence and lessons from a systematic review (No. CIFOR Infobrief no. 161). Center for International Forestry Research (CIFOR), Bogor, Indonesia.

Heltberg, R. (2001). Determinants and impact of local institutions for common resource management. Environment and Development Economics. 6(2): 183 –208.

Hendrickson, C. (1996). Selling Guatemala: Maya Export Products in US Mail-order Catalogues,Cross-cultural Consumption: Global Markets, Local Realities. London and New York: Routledge.

Hobley, M., & Shah, K. (1996). What makes a local organisation robust? Evidence from India and Nepal. Natural Resource Perspectives. 11: 1 –9.

Hugar, I. I., Sathyanarayana, K., Murkute, G. V., & Pande, A. B. (2016). Progressive association of sericulturists (PAS): An experience of BAIF in silk product marketing and promotion in Maharashtra. International Education and Research Journal. 2(2): 59 –61.

Human Development Report. (2014). Sustaining human progress: Reducing vulnerabilities and building resilience. New York, USA: United Nations Development Programme.

Islam, M. A., & Quli, S. M. S. (2016). Non-Timber Forest Products (NTFPs) supporting food security In Tribal Jharkhand. Jharkhand Journal of Development and Management Studies. 14(1): 6855 –6864.

Islam, M. A., Quli, S. M. S., Rai, R., Ali, A., & Gangoo, S. A. (2015). Forest biomass flow for fuel wood, fodder and timber security among tribal communities of Jharkhand. Journal of environmental biology. 36(1): 221 –228.

Islam, M. A., Quli, S. M. S., Sofi, P. A., Bhat, G. M., & Malik, A. R. (2015). Livelihood dependency of indigenous people on forest in Jharkhand, India. Vegetos. 28(3): 106 –118.

Islam, M. A., Rai, R., & Quli, S. M. S. (2014). Manpower potential, employment status and forest based livelihood opportunities among tribal communities of Jharkhand, India. Journal of Human Ecology. 47(3): 305 –315.

Islam, M. A., Rai, R., & Quli, S. M. S. (2015). Forest Resources Use for Building Livelihood Resilience in Ethnic Communities of Jharkhand. Trends in Biosciences. 8(5): 1256 –1264.

Jana, R. B., Mohanty, B. P., & Springer, E. P. (2008). Multiscale Bayesian neural networks for soil water content estimation. Water Resources Research. 44(8): W08408, doi:10.1029/2008WR006879.

Jangdey, M. S., Gupta, A., Kaur, C. D., & Saraf, S. (2016). Assessment of utilization, value addition and characterization of tamarind: A natural gum of Chhattisgarh. International Journal of Pharmaceutical Research & Allied Sciences. 5(2): 323 –334.

Jha, J. K., & Singh, M. (2015). Human resource (HR) & social challenges faced by microfinance in India: a framework. Indian Journal of Industrial Relations, 50(3): 494 –505.

Kala, C. P. (2009). Aboriginal uses and management of ethnobotanical species indeciduous forests of Chhattisgarh state in India. Journal of Ethnobiology and Ethnomedicine. 5:20. doi.org/10.1186/1746-4269-5-20.

Kamkhenthang, H., & Roy Burman, B. K. (1988). A transborber tribe of India and Burma. Delhi, India: Mittal Publications.

Kapila, P. (2015). Impact assessment of skill development programme for rural women in district Ludhiana. Journal of Krishi Vigyan. 21(35): 55 –58.

Kashyap, P., & Raut, S. (2006). The Rural Marketing Book. New Delhi: Biztantra.

Kaur, A. (2015). Ensuring Better Natural Resource Management Through Gender Mainstreaming. Journal of Krishi Vigyan. 21(35): 32 –39.

Kaushal, K. K., & Melkani, V. K. (2005). India: achieving the Millennium Development Goals through non-timber forest products. International Forestry Review. 7(2): 128 –134.

Khan, N. A., & Rashid, A. M. (2006). A study on the indigenous medicinal plants and healing practices in Chittagong Hill Tracts (Bangladesh). African Journal of Traditional, Complementary and Alternative medicine. 3(3): 37 –47.

Krishna, A. K., & Govil, P. K. (2005). Heavy metal distribution and contamination in soils of Thane–Belapur industrial development area, Mumbai, Western India. Environmental Geology. 47(8): 1054 –1061.

Kulkarni, R., Shah, A., & Boppana, R. (2008). Development and evaluation of xyloglucan matrix tablets containing naproxen. Asian Journal of Pharmaceutics. 2(2): 102 –105.

Kumari, R. (2000). Women welfare programmes. Hyderabad: Publication Booklinks Corporation.

Kureel, R. S., Kishor, R., Dutt, D., & Pandey, A. (2009). Mahua: a potential tree borne oilseed. National Oil seeds and Vegetable oils development Board. Gurugaon, India: Ministry of Agriculture, Govt. of India.

Lokhande, M. A. (2013). Micro finance for women empowerment-a study of self-help groups-bank linkage programme. International Center for Business Research. 2: 159 –166. London, DFID: 53-65.

Marshall, E., Schreckenberg, K., & Newton, A. C. (2006). Commercialisation of Non-timber Forest Products: Factors Influencing Success. Lessons Learned from Mexico and Bolivia and Policy Implications for Decision-makers. Cambridge: UNEP World Conservation Monitoring Centre.

Maske, M., Mungole, A., Kamble, R., Chaturvedi, A., & Chaturvedi, A. (2011).

Impact of non timber forest produces (NTFP's) on rural tribes economy in Gondia District of Maharashtra, India. Archives of Applied Science Research. 3(3): 109 –114.

Mayoux, L. (1995). Beyond naivety: women, gender inequality and participatory development. Development and Change. 26(2): 235 –258.

Meher R. (2010). How Mineral-based Industrial Development Marginalizes and Displaces People in India: Three Case Studies. Lewiston, New York: Edwin Mellen Press.

Meher, R. (2009). Globalization, displacement and the livelihood issues of tribal and agriculture dependent poor people: the case of mineral-based industries in India. Journal of Developing Societies. 25(4): 457 –480.

Mehta, A. K., & Shah, A. (2003). Chronic poverty in India: Incidence, causes and policies. World Development. 31(3): 49 –511.

Mishra, S. (2007). Household livelihood and coping mechanism during drought among oraon tribe of Sundargarh District of Orissa, India. Journal of Social Science. 15(2): 181 –186.

Mosothwane, M. N. (2007). Skeletal characteristics and population demography as reflected by materials from Toutswe tradition sites in eastern Botswana, west of the Shashe-Limpopo basin (Doctoral dissertation, University of Pretoria).

Munang, R. T., Thiaw, I., & Rivington, M. (2011). Ecosystem management: Tomorrow's approach to enhancing food security under a changing climate. Sustainability. 3(7): 937 –954.

Muthuramu, S., Paulpandi, V. K., Sakthivel, S., Ramakrishnan, K., & Karthik, R. (2015). Empowerment of self help group members of Virudhunagar district through vocational trainings on mushroom production. Journal of Krishi Vigyan. 21(35): 23 –26.

Mwaura, P. (2008). Indigenous knowledge in disaster management in Africa. Nairobi: United Nations Environment Programme.

Nair, D. (2012). Branding Imperatives for Handicraft Products. Rixvi institute of management studies & research, Management Vision. 2(2): 35 –45.

Nakatani, A. (2001) Exoticism and Nostalgia: Consuming Southeast Asian Handicrafts in Japan'. 3rd EUROSEAS Conference, London.

Naresh, G. (2014). Indebtedness among konda reddy tribal households in Khammam district of Telangana. Journal of Indian Research. 2(4): 47 –51.

National Research Council. (1997). The new Americans: Economic, demo- graphic, and fiscal effects of immigration. Washington, DC: National Academy Press.

Nayak, B. P., Kohli, P., & Sharma, J. V. (2012). Livelihood of local communities and forest degradation in India: Issues for REDD+. Ministry of Environment and Forests Government of India New Delhi India. Web: http://envfor. nic. in/assets/redd-bk3. pdf. Accessed, 18, 2012.

Nayak, B., P. Wrethmann, C. and Aggarwal, V. (2013). Community based resource pooling for access to o cleaner cooking fuel among urban poor. Green Growth Dev. Q. 2(1): 14 –26.

Neumann, R. P., & Hirsch, E. (2000). Commercialisation of non-timber forest products: Review and analysis of research. Bogor, Indonesia: Center for International Forestry Research, Rome: FAO.

Ningshen, P., & Boraian, M. P. (2013). Empowerment of tribal women in Ukhrul District, India – the role of IFAD supported SHGs. Journal Of Humanities And Social Science. 16(3): 37 –41.

Nithya, N. R. (2013). Land question and the tribals of Kerala. International Journal of Scientific & Technology Research. 2(2): 102 –105.

Niyaj, A. & Singh, P. (2014). Change detection analysis of forest area of Kenda village of Kota block, Bilaspur, Chhattisgarh. International Journal of Research in Advent Technology. 2(2): 348 –353.

Olorunfemi, F., Fasona, M., Oloukoi, G., Elias, P., & Adedayo, V. (2016). Traditional Knowledge in the Use and Management of Forest Ecosystem for Livelihoods and Food Security in Nigerian Savanna. Journal of Human Ecology. 53(2): 167 –175.

Pallarès-Blanch, M., Tulla, A. F., & Vera, A. (2015). Environmental capital and women's entrepreneurship: A sustainable local development approach. Carpathian Journal of Earth and Environmental Sciences. 10(3): 133 –146.

Paltasingh, T., Paliwal, G. (2014). Tribal population in India: Regional dimensions & imperatives. Journal of Regional Development and Planning. 3(2): 27—36.

Panda, S. S. (2013). SHG a change agent for rural women empowerment and entrepreneurship development in western Orissa. International Journal of Educational Research. 1(3): 2306 –7063.

Pant, R. (2015). Protecting and promoting traditional knowledge in India. London, UK: International Institute for Environment and Development.

Patel, M., & Naik, S. N. (2010). Flowers of Madhuca indica JF Gmel.: Present status and future perspectives. Indian Journal of Natural Products and Flowers. 1(4): 438-443.

Patel, P. K., Prajapati, N. K., & Dubey, B. K. (2012). Madhuca indica: a review of its medicinal property. International Journal of Pharmaceutical Sciences and Research. 3(5): 1285 –1293.

Patel, S. (2013). Empowerment of women through self help groups a comparative study of tribal and non tribal districts in Orissa. (Doctoral dissertation, University of Delhi).

Priyadarshini, P. (2015). Tribal Development: Prespective, Programmes and Critique. (Unpublished)

Ray, S., Shah, A., Chaurasia, A. R., & Banerjee, R. (2012). Poverty reduction strategy for Madhya Pradesh. Mumbai, India: Indira Gandhi Institute of Development Research.

Reddy, C. S., Jha, C. S., & Dadhwal, V. K. (2013). Assessment and monitoring of long-term forest cover changes in Odisha, India using remote sensing and GIS. Environmental monitoring and assessment. 185(5): 4399 –4415.

Robinson, J. B., & Herbert, D. (2001). Integrating climate change and sustainable development. International Journal of Global Environmental Issues. 1(2): 130 –149.

Ruiz-Pérez, M., B. Belcher, R., Achdiawan, M., Alexiades, C., Aubertin, J., Caballero, B., Campbell, C., Clement, T., Cunningham, A., Fantini, H., de Foresta, C., García Fernández, K. H., Gautam, P., Hersch Martínez, W., de Jong, K., Kusters, M. G., Kutty, C., López, M., Fu, M. A., Martínez Alfaro, T. R., Nair, O., Ndoye, R., Ocampo, N., Rai, M., Ricker, K., Schreckenberg, S., Shackleton, P., Shanley, T., Sunderland, & Y. Youn. (2004). Markets drive the specialization strategies of forest peoples. Ecology and Society. 9(2): 1 –9.

Salim, I. M., & Sulaiman, M. (2011). Organizational learning, innovation and performance: A study of Malaysian small and medium sized enterprises. International Journal of Business and Management. 6(12): 118 –125.

Sebastian, F. T. M. (2013). The use of mahua oil in achieving a sustainable business model in rural entrepreneurship. AU-GSB e-JOURNAL, 6(1).

Seshagiri, M., Gaikwad, R. D., Paramjyothi, S., Jyothi, K. S., & Ramchandra, S. (2007). Antiinflammatory, anti-ulcer and hypoglycemic activities of ethanolic and crude alkaloid extract of Madhuca indica (Koenig) Gmelin seed cake. Oriental Pharmacy and Experimental Medicine. 7(2): 141 –149.

Shah, A. (2010). In the shadows of the state: Indigenous politics, environmentalism, and insurgency in Jharkhand, India. Jharkhand, India: Duke University Press.

Shah, A., & Sah, D. C. (2004). Poverty among tribals in South West Madhya Pradesh: has anything changed over time?. Journal of Human Development. 5(2): 249 –263.

Shankar, M. K. B. (2015). Sustainment of traditional practices towards sustainable agricultural growth and allied practices by women: An observational study of Itda Parvathipuram region. International Journal of Humanities & Social Science Studies. 2(1): 233 –238.

Sharma, R. C. (2005). Proceedings of the workshop on Forest for Poverty Reduction: Changing role for research, development and training institution. Food and Agriculture Organization of the United Nations Regional Office For Asia And The Pacific Bangkok. 190-120. http://www.fao.org/docrep/008/af349e/af349e00.html.

Sharma, S., Sharma, M. C., & Kohli, D. V. (2010). Wound healing activity and formulation of ether-benzene-95% ethanol extract of herbal drug Madhuca longifolia leaves in albino rats. Journal of Optoelectronics and Biomedical Materials. 1(1): 13 –15.

Shukla, N., & Pandey, S. (2015). Performance measurement of marketing of forest produce In Chhattisgarh state. International Research Journal of Engineering and Technology. 2(8): 1659 –1664.

Sikarwar, R. L. S. (2001). Ethnobotany of Madhya Pradesh. Appl Bot Abst. 21(2): 133 –147.

Singh, A. K., & Rajyalakshmi, C. (1993). Status of tribal women in India. Social Change. 23(4): 3 –18.

Singh, P. K., & Quli, S. S. (2011). Economic Valuation of Non Timber Forest Products Contribution in Tribal Livelihood in West Singhbhum District of Jharkhand. Indian Forester. 137(11): 1258 –1264.

Singh, S. P., & Sharma, S. C. (2015). A survey on cluster based routing protocols in wireless sensor networks. Procedia computer science. 45: 687 –695.

Sinha, M. K., Kanungo, V. K., & Naik, M. L. (2016). Ethnobotany in relation to livelihood security in district Bastar of Chhattisgarh state with special reference to non-timber forest produces. Current Botany. 7: 27 –33.

State of Environment Report India 2009, Ministry of Environment and Forests, Government of India.

Stephen, L. (1993). Weaving in the Fast Lane: Class, Ethnicity and Gender in Zapotec Craft Commercialization, Crafts in the World Market. The impact of global exchange on Middle American artisans. Albany: SUNY Press.

Sunderlin, W. D., Angelsen, A., Belcher, B., Burgers, P., Nasi, R., Santoso, L., & Wunder, S. (2005). Livelihoods, forests, and conservation in developing countries: An overview. World Development. 33(9): 1383 –1402.

Sunderlin, W.D., Angelsen, A., Wunder, S. (2003). Forests and poverty alleviation. In: State of the World' s Forests. Rome, United Nations: Food and Agriculture Organization.

Sunita, M., & Sarojini, P. (2013). Madhuca lonigfolia (Sapotaceae): A review of its traditional uses and nutritional properties. International Journal of Humanities and Social Science Invention. 2(5): 30 –36.

Taori, K., & Singh, S. (1995). Rural industrialisation: a plan for the future. New Delhi, India: Vikas Publishing House.

Tewari, D. D., & Campbell, J. Y. (1995). Developing and sustaining non-timber forest products: some policy issues and concerns with special reference to India. Journal of Sustainable Forestry. 3(1): 53 – 79.

Tiwari, G. (2013). Joint forest management for decline off villagers migration problem: A case study of three villages of central India. International Journal of Science and Research. 2(12): 19 –22.

Thampi, K. B. (2012). Assessment of the contribution of forestry to poverty alleviation in India. Making forestry work for the people: Assessment of the contribution of forestry to poverty alleviation in Asia and the Pacific, Bangkok: FAO, 99-139.

Turton, C. (2000). The sustainable livelihoods approach and programme development in Cambodia. London: Overseas Development Institute.

UNEP (2011). UNEP Bridging the Gap Report. Nairobi, Kenya: United Nations Environment Programme.

Utz, A., & Dahlman, C. (2007). Promoting inclusive innovation. Unleashing India's Innovation, 105.

Varte I.Z. (2012). Role of indigenous traditional knowledge in sustainable resource management (with special reference to North East India). Regional seminar on Environmental Issues in North East India, Churachandpur, Manipur. 12 –13.

Verma, M. (2015). Changing status of tribal women in Bastar district of Chhattisgarh. International Journal of Development Research. 5(3): 3868 –3872.

Verma, S. K., & Paul, S. K. (2016). Sustaining the non-timber forest products (NTFPs) based rural livelihood of tribal's in Jharkhand: issues and challenges. Jharkhand Journal of Development and Management Studies XISS, Ranchi. 14(1): 6865 –6883.

WCED, 1987. Our common future. Report of the World Commission on Environment and Development. London, UK: Oxford University Press.

Wickens, C. D. (1991). Processing resources and attention. Multiple-task performance. 3-34. DOI: 10.1371/journal.pone.0035946.

Williams, G., Thampi, B. V., Narayana, D., Nandigama, S., & Bhattacharyya, D. (2012). The politics of defining and alleviating poverty: State strategies and their impacts in rural Kerala. Geoforum, 43(5), 991 –1001.

Zoa, M. (2009). Community forests: Reconciling customary and legal concepts. In Search of Common Ground, 117.

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