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Quality of Life: Challenges and Opportunities in the Crossroads of the Mediterranean

ASSOCIAZIONE ITALIANA PER GLI STUDI
SULLA QUALITÀ DELLA VITA

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Quality of Life: Challenges and Opportunities in the Crossroads of the Mediterranean

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Introduction

AIQUAV – Associazione Italiana per gli Studi sulla Qualità della Vita – is a point of reference for all those who in our country, but not only, conduct theoretical reflections and empirical research on the issue of quality of life; an increasingly crucial theme in a contemporary society strongly characterized by social imbalances, negative environmental effects, contradictions linked to economic development. On the 2023 Annual Conference, the accent will be placed on the Mediterranean, a crossroads and well-being for many populations. The conference will be held in a mixed-mode on-site/web. Both theoretical and applied contributions about well-being, opportunities but also responsibilities in the Mediterranean are solicited and welcome.

The Mediterranean has always been the theatre and crossroads of different peoples, cultures, traditions and religions. Some of the greatest civilizations of the past arose on the shores of the Mare Nostrum and have indelibly marked the course of history.

Few areas in the world match the historical density, heterogeneity and complexity of social interaction that, due to geographical proximity and mobility, have emerged in the Mediterranean world. The multiple realities that distinguish it offer a privileged point of observation for tackling the study of the problem of how communities belonging to different religions, languages, ethnic groups and traditions can interact with each other over time.

The contributions that will are collected represent an opportunity to explore some of the problems related to the interrelationship between the different peoples who inhabit the Mediterranean today, both from the point of well-being of the peoples, as well as from the demographic, statistical, socio-cultural, economic and legislative. Contributions from different disciplines were accepted and encouraged, from sociology to statistics, from law to economics, and so on.

Bari, 28/09/2023

Section I

Short papers

Is thriving in times of crisis and uncertainty possible? Yes with frugal management.

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1. Introduction

Today if management does not adapt quickly to changes in the market and customers, it becomes extinct. One way to fight business extinction is through FRUGAL MANAGEMENT, which combines efficiency and solidarity, innovation and well-being, tangible assets and relational assets, economic capital and social capital. With a 4- dimensional model, a series of examples, and best practices to experience right away, Frugal Management expands the traditional meaning of "sustainability" with a new, more efficient and rational approach that lays the foundation for lasting success by positively impacting the community and stakeholders. How do you generate Sustainable Value for customers with innovative products or processes? How can Frugal Management help me grow sustainably and responsibly?

The sustainability manager accelerates corporate business is the title of a latest Forbes article1 , but in Italy only 7 percent of companies have one, this percentage rises to 37 percent for companies with more than 50 employees. "Companies today are being called upon to focus on a new approach to sustainability.

We cannot think of managing a company, an entity or an organization by paying more attention only to environmental and social impact, but we must create and rethink a corporate strategic line that starts from the redefinition of mission and vision and that incorporates within it a new DNA that I call "Frugal" because it in-

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corporates three indispensable characteristics: sobriety in choices, sustainability and responsibility. Three elements that must guide new management paths with a view to increasing sustainable value generation for internal customers, external customers, the community and stakeholders.

A vision, which must guide management over the long term, overcoming the many difficult times and black swans that have now been on the agenda for the past two years. For this we need a new mindset, new KPIs (key performance indicators) a new marketing able to grasp the impact inside and outside the company perimeter, but above all new visual reporting tools, which allow in a few seconds to have a picture of the situation, immediately identifying the areas in which to intervene. With Frugal Managment, I wanted to chart a new path for entrepreneurs, managers, professionals, executives, start-ups, organizations, entities, and businesses that see innovation and sustainability as the two keys to success.

A new path to continuously improve the way we do things by taking care to think sustainably and generating positive impact in four aspects: social, digital, environmental and business. I went beyond the classic ESGs or SDGs by adding a new area that of innovation and digitization that adds to the new management approach calculating now that some businesses are only digital.

The book is organized into 5 chapters that talk about the genesis of the Frugal Management model, recounting the evolutionary process going through operational tools and ending with practical cases of Italian SMEs and organizations and two international cases that with this new approach have managed to thrive in times of crisis and grow by investing in training, in a new way of doing things, and above all in attention to the near future.

2. The unsustainable economy and the need for a new management model

As anticipated at the beginning, we must understand that the current economic system is unsustainable. We are faced with the moral imperative, and the practical urgency, to rethink many things: how we produce, how we distribute, how we consume, how much we waste, how we exploit digital resources, what is the short-term vision, what is the social impact of our actions, increasing inequality and dependence on harmful energy sources. These are all challenges we need to think about now, and we may even be too late. Given the complexity of the situation, I have analyzed some economic models and philosophies of the past that have withstood

various crises over time, wars that I was inspired by and then built a more innovative model but with solid foundations and above all sober, responsible and sustainable. The models and philosophies are basically three: integral ecology, Franciscan economy and Benedictine economy. I chose these three "models" because despite their age they are still attural in some ways and can even express characters of innovativeness as we shall see later.

3. The guiding framework toward Frugal excellence

"Change does not always equal improvement, but to improve you have to change." Winston Churchill. Learning from mistakes is the new karma. In order to improve, it is necessary to change, model, experiment, and then make mistakes. Corporate management many times has limitations related to numbers and many times these limitations are related to beliefs, so there is a need for deep reflection and the adoption of a new way with which to approach each activity in a way that succeeds in guiding managers with effective and efficient actions. In order for us to move towards a true process that brings Sustainable Value to management, we need to challenge ourselves from all points of view, cultural, social, digital, scientific, by taking a "humility bath" and changing the mindset. There is a need to focus on some key elements such as continuous improvement, the praise of error, but above all a measurable model that has a scientific basis. Deming's scientific method - PDCA and SPDCA Underlying it all, therefore, is the need to adopt a continuous improvement process supported by a scientific method PDCA (Plan - Do - Check - Act) or Deming cycle, which was created with the goal of improving quality. These four steps provide the framework for continuous improvement. The PDCA cycle basically starts with a plan and ends with an action based on the information learned during the process. The first phase that anticipates the process is Scan - Analyze: it means do a resource check before you start and a situation check trying to monitor the kpi in the initial phase and then compare them in a final chek phase and analyze the possible improvement. P = Plan - plan: represents the phase of planning and collecting data, information, problems. During this phase the goal of improvement supported by hard data and numbers should be clearly defined. In addition, the causes of the problems or what prevents the company from achieving the set goals should be analyzed. Planning should also include some decisions about the change to be implemented, and the development of an operational plan to implement the change. If the basis of the Plan does not have hard data available,

nothing that is not measurable can be improved. D = Do - do: In this second phase, previously defined improvement actions, necessary training or additional support to execute the plan are implemented. It is important that the teams in the different business areas, completely understand the goals and the plan and in accordance with the procedures necessary to achieve the goals. The work is then executed according to these procedures. The most important thing is to try to move as quickly as possible to the "Doing" stage because data analysis is mainly for making immediate decisions. C = Check - check and study: it is necessary to check whether the work is proceeding according to plan and to study whether the expected results have been achieved. The performance of planned activities must be checked and monitored by also analyzing any deviations. The results of the work should be compared with the objectives as often as possible. If the monitoring reveals a deviation from the target, a search for the cause of the misalignment must be initiated to prevent its recurrence. Then the data should be analyzed, compared with the forecast, acquire the results, if acceptable proceed with full implementation of the plan or return to the PLAN phase. A= Act - take action: if feedback from actions taken tells us that the goal has been achieved, then the process and audits needed to maintain the standards achieved over time should be standardized. Move on to implement new improvement plans, or other projects starting again from the first phase Plan. If the work is not performed according to the plan or the results are not as expected, new measures for appropriate action must be developed by going back to phase 1 and modifying the continuous improvement strategies. The PDCA method should be repeated over and over again to improve always and sustainably by trying to use fewer resources and employing them in the best possible way. Improvement can only come out of an agile approach and as a result of mistakes, insights, identification of waste, and with a focus on Sustainable Value.

4. The dimensions for a Frugal Society and Sustainable Value

In order to create Sustainable Value for the customer, the company and the community, moving toward a Frugal Society, it is crucial to adopt a management model that takes into account all the key dimensions: eliminating waste, valuing people, reducing the environmental impact, having business sustainability, and producing well-being for stakeholders through digital innovation as well. This complex perspective requires deep thinking and a holistic approach within the company, but once it is consolidated, it opens the door to a more efficient, customer-centric, and

sustainable way of operating in the long term. A model that is both simple and complex for an evolving company. The reason I formulated this model based on four interconnected dimensions is that today it is no longer enough to adopt a lean approach, but we need to go beyond it, toward a new sustainable lean approach. Let us see why each of these pillars is critically important.

Environment: the environmental impact of business activities has become a crucial issue in the modern era. Companies must adopt sustainable and responsible practices to minimize resource use, reduce greenhouse gas emissions, prevent pollution, and preserve biodiversity. Incorporating eco-friendly measures into the Frugal Management model promotes environmental conservation and helps build a more sustainable future.

Business: sustainable value for the customer and the company itself cannot be achieved only through short-term profit. Companies must take a long-term view, considering the impact of their actions on internal parties such as transparency with employees, suppliers, and external parties with the local community. By focusing on ethical and responsible management, the Frugal Management model promotes fairness, stakeholder involvement, and the well-being of the company while making overall management more efficient.

Social: Corporate social responsibility is becoming increasingly relevant in today's society. Companies must take responsibility for creating a positive impact in the communities in which they operate, promoting inclusion, diversity, social justice and contributing to improving the quality of life. Integrating the social aspect into the Frugal Management model means focusing on people's well-being, improving working conditions and supporting social initiatives, having an active social role in the community, with a quasi-political line.

Digital: digital transformation is redefining the way companies operate, communicate and create value. Properly integrating digital innovation into the Frugal Management model, a novel element to all ESG models, enables companies to leverage new technologies to optimize processes, improve efficiency, collect and analyze data to make evidencebased decisions, and deliver personalized customer experiences. Digital innovation drives business growth and competitiveness, but also inclusion and accessibility, while enabling leaner and more efficient management of resources.

The question we have to ask ourselves at the business and management level is: does the solution we are going to propose that will then be concretely translated into the product, service, process, or innovation solve every problem to the customer in a sustainable way on the 4 levels? In a word does it meet the requirements and

bring the benefits Business, Environment, Social and Digital? This model which may seem utopian in some cases, has one merit, that of increasing the power of initial reasoning and planning with respect to each action. It summarizes the principles of lean consumption so as to compare and evaluate effectiveness in relation to each principle. The solution that gets the highest score will certainly be the most sustainable and therefore to be adopted as a priority. In case it is not positively received by the market, the adoption of the second or third solution in order of score will be considered.

5. The dimensions for a Frugal Society and Sustainable Value

From an international dimension to a local dimension. There are some examples of Frugal Management: from even large companies, but the real challenge lies with SMEs that have to disentangle limited resources, organization, economic, environmental, digital, social sustainability, we will look at some virtuous examples of companies and specific projects. I will start with Italian Frugal Management examples to get to some international projects.

Local project:

HIGHPAPER: the frugal innovation in tissue market

PANECOTTO: the first ethical bistro in the “Sassi of Matera”

PANE E PACE: the redemption of waste

OLIO DEI SASSI: extravirgin olive oil a neverending expericence

ADO POSITIVE IMPACT: The donation that improves Well Being

TENUTA PARCO DEI MONACI: an excellent wine with negative carbon foot print

BEB PETRA / HOSTEL BASILICATA AL VOLO: the mountain tourism, frugal e and sustainable

RISTORANTE DI PANE: from waste of bread to a new gourmet restaurant

International project:

COLDPLAY: a tour that goes beyond sustainability

KIGNON.FR: when production rhymes with inclusion

Modular Neural Networks for detection and classification of brain cancer images

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Abstract: Among the various oncological pathologies, brain cancer continues to be one of the most wide-spread, as well as lethal, diseases. Within this paper we extended a previous work leveraging the early exits strategies to reduce the computational time needed to detect and classify brain tumor MRI images namely say – glioma, meningioma, and pituitary. The dataset we used consisted of 3264 2-D MRI images and 4 classes. Due to the small number of images, various data augmentation techniques were used to increase the size of the dataset. Our proposed methodology consists not only of data augmentation, but also of various techniques of image denoising, skull strip-ping, cropping and bias correction. In our working proposal, we implemented a custom CNN and we explored both a static and dynamic solution of Early Exit procedure to achieve the smallest computational effort. The purpose of this document is to distinguish between normal and abnormal pixels and classify them more rapidly but with a comparable level of accuracy.

Keywords: brain cancer, custom CNN model, detection.

1. Introduction

A brain tumor refers to an atypical cell overgrowth within brain tissue which can be categorized as either benign or malignant depending on its capacity to invade other areas of the body. The central nervous system, comprising the brain and spinal cord, plays a crucial role in coordinating various bodily functions acting on

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both voluntary functions such as walking or talking and involuntary functions like breathing or digesting. Additionally, the central nervous system serves as the foundation for sensory functions encompassing sight, smell, touch, hearing, and taste and it plays a pivotal role in governing emotions and facilitating the so-called higher-order activities such as memory and learning.

Typical, the process of diagnosing a brain tumor starts when the patient visit the general practitioner due to the manifestation of symptoms. Subsequently, the doctor assesses whether further investigation with a neurology special ist is necessary or prescribes instrumental diagnostic tests. Nevertheless, in some cases symptoms may arise abruptly and unexpectedly, requiring a prompt evaluation by the emergency department for urgent medical attention. When there is suspicion of a brain tumor, magnetic resonance imaging (MRI) serves as the primary diagnostic test. When compared to CT scans, MRI, combined with or without the utilization of paramagnetic contrast medium (gadolin ium), offers several advantages. In fact, it facilitates the identification of lesions and nodules, it generates detailed three-dimensional (3D) images, and it provides comprehensive information about the tumor's location, dimensions, spread as well as its relationship with surrounding structures, including critical regions known as "eloquent" areas. Furthermore, functional MRI techniques like diffusion and perfusion provide additional valuable information regard ing the cellular composition and vascularization of the analyzed regions. Based on 3264 2-D MRI images, advanced analysis models will be evaluated to understand the performance and the peculiarities of Early-Exits techniques with the aim of distinguishing between normal and abnormal pixels and classifying them more rapidly with a tolerable high level of accuracy.

2. Related works

Ranit Sen, Gopinath Balaji and Harsh Kirty [Ranit Sen et al., 2022] use several pretrained networks reaching about the same performance with the Efficient Net B0 network, but they do not use any network from scratch. In paper [Abiwinanda et al., 2019], the authors use different CNN architectures, obtaining however a validation accuracy far enough from the training accuracy.

In [Chollet, 2017] the authors used a machine learning approach with a SVM classifier but the main disadvantage of this procedure is the inability to extract interesting features for classification. For what concerns the Early-Exits strategy, the work provided in [Scardapane, S., Comminiello, D., Scarpiniti, M.,Baccarelli, E.

and Uncini, A., 2020] and [Jang, E., Gu, S. and Poole, B., 2017] serve as guiding inspiration to understand the advantages of this approach. This methodology could be very useful in the healthcare sector due to the large number of images available through the entire diagnostic procedure and the time required to analyze them.

3. Method

Deep neural networks (DNNs) have emerged as the leading techniques for various tasks, thanks to their capability to extract features during the learning process and to the possibility of optimizing the network parameters in order to minimize the error. Recently, DNNs have demonstrated excellent performance in analyzing medical images com pared to traditional machine learning methods [Bauer et a., 2013].

Nevertheless, the enhanced performance achieved by additional layers in a deep network comes at the expense of increased latency and energy consumption during training and inference phase. As networks grow deeper and larger, these costs be-come increasingly challenging to manage, particularly in real-time and energy-sensitive applications creating possible logistic difficulties during the distribution of the application. The standard configuration of deep neural networks involves a series of differentiable layers, yielding predictions only at the final stage. Re-searchers have proposed the integration of Early Exits within these networks, ena-bling predictions to be acquired at interme diate points. Multi-output networks of-fer numerous advantages, such as (i) substantial inference time reduction, (ii) de-creased likelihood of over-fitting and vanishing gradients. For this reason, in this work we proposed a custom CNN using both a statistic and dynamic Early-Exits solutions.

The typical pipeline of an image-based cancer classification study using a CNN is shown in Figure 1.

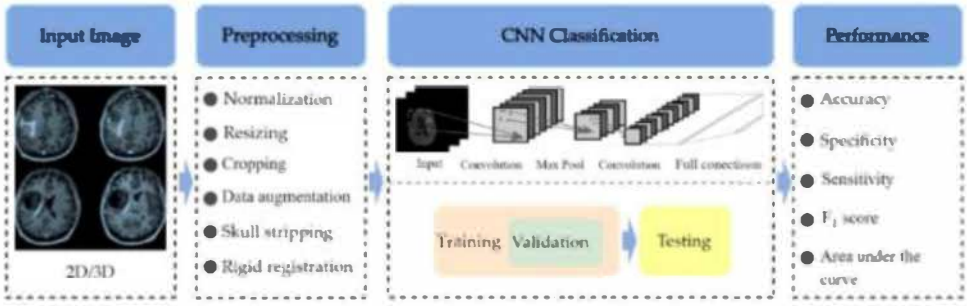

Figure 1: Pipeline of CNNs-based Brain Cancer Classification

3.1 Pre-processing

As a first operation, the dataset was split into Training Set and Test Set. Subsequently the preprocessing operations were applied only to the Training data and during the training phase of the models, 10% of the Training data was used as Validation Set for parameters tuning. Fig. 2 shows the data split.

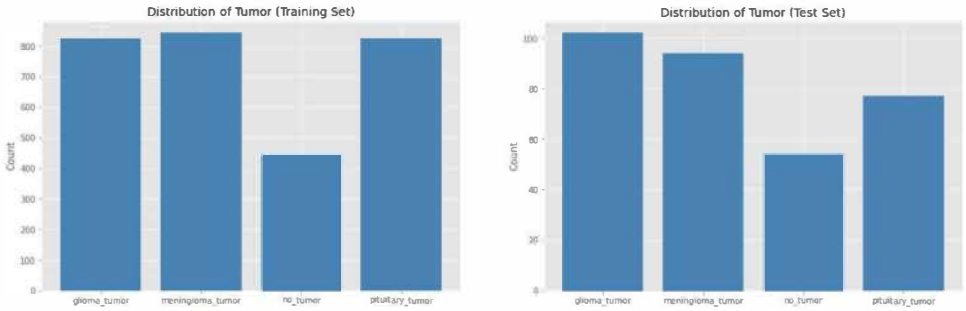

Figure 2: Distribution of classes for Training Set and Test Set

3.1.1 Pre-processing phases

1. Resize: The first pre-processing operation applied was to resize the image to a size of (150, 150).
2. Noise Reduction: To change the resolution of the original images, a Gaussian filter has been applied to reduce noise and blur the images. In Fig. 3 it's possible to

see an example of an image filtered.

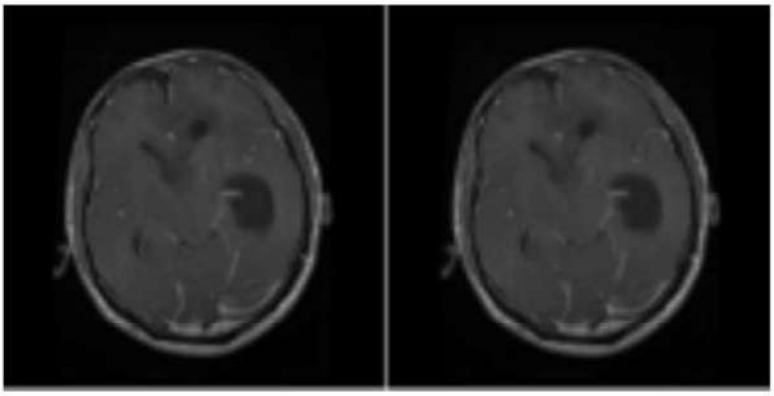

Figure 3: Original Image and Filtered Image with Gaussian Method

3. Data Augmentation: To make the proposed methods more robust and reduce the over-fitting effect, Data Aug mentation was applied with various transformations, in particular:

- rescaling
- rotation with an angle of 30 degrees
- vertical and horizontal shift
- image zoom
- horizontal flipping

In Fig. 4 it is possible to observe the example of an original image and the respective transformation.

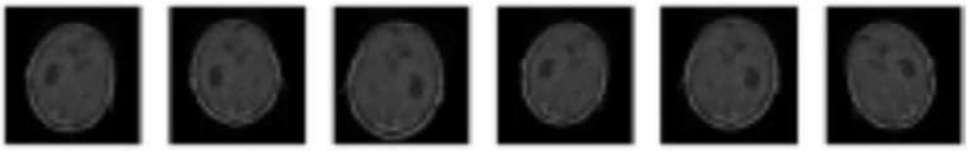

Figure 4: Example of Original Image and Respective Transformations

4. One-Hot Encode: The last operation carried out was the transformation of the reference variable which was originally coded as numeric into a categorical variable.

3.2 Models

We chose to use a CNN architecture over any other model because CNN employs several convolutional filters to scan the whole feature matrix and perform dimensionality reduction, hence making them well suited for image processing and classification.

3.3 Baseline CNN Model

We used different parameters to train the model in the best possible way. To speed up the training a batch size of 64 was used and the models were trained for 40 epochs. The optimization algorithm chosen to train the models is Adam because it is computationally efficient, easy to implement and works well for problems that involve large amounts of data or parameters. The learning rate was chosen in a dynamic way, starting from a value of 1e-3 and monitoring the validation loss: if the loss does not decrease by at least 0.2 for two consecutive epochs, the learning rate is reduced of a factor of 0.3. The loss function chosen is the Categorical Cross-Entropy which is used to calculate and minimize the error of the model during the optimization process. This is a typical choice for a multi-class classification model. The loss is defined by:

$$L = \sum_{i=1}^{\text{output size}} y_i \cdot log(\hat{y}_i)$$

To make a fair comparison between the models, we fixed the number of epochs to 40 and we evaluated both the performances and the dynamics of the models at the end of the training. For the CNN implemented from scratch, in addition to the above configuration, several techniques have been used to improve their performance. The model contains 6 layers including input and output layers and 2 Early Exits. Each layer consists of 2D convolution, Max Pooling 2D, Batch Normalization and Dropout operation. The final layer (Fully Connected Layer) is composed of 1024 neurons connected to the 4 output neurons (one for each class to be provided) and managed by the softmax function. The activation function chosen is the ReLu function. For the dropout operation, the value of p is 0.25 and 0.4 for the output layer. For performance evaluation, the following metrics were used: Accuracy, Precision, Recall and F1-Score.

3.4. The statistical approach

Consider the output of a CNN model defined as fe(x) for some layer e. An Early Exit can be considered as a small classifier added on top of it:

$$\hat{y}_e = c_e(f_e(x))$$

The advantage of this approach is that the neural network provides a sequence of predictions $\hat{y}_1$, $\hat{y}_2$,..., one for each Early Exit, that can achieve different values of accuracy, in addition to the final classification $\hat{y}$. This approach presents three major problems:

1. Determine the optimal placement of an Early Exit. A solution could be to calculate the relative floating-point operations per second (FLOPS) after each computational block and strategically incorporate Early Exits at specific percentages of the total compute cost. For instance, we could add exits after 25%,50%, and 75% of the total compute cost of the model. Another alternative is to consider the amount of time needed during the inference phase.
2. How can we train a model that incorporates multiple exits for each input?
3. During the inference phase, how do we determine whether to exit the model at a specific point or proceed to the next available exit?

In order to make a joint training of the exits, consider a pair (x, y), there are E early predictions $\hat{y}_1$,..., $\hat{y}_E$ and a final prediction $\hat{y}$. It's useful to define a joint loss by adding all the losses:

$$Total\ loss = CE(\hat{y}, y) + \sum_e \lambda_e \cdot CE(\hat{y}_e, y)$$

where CE($\hat{y}$, y) is the loss of Early Exit e and the weights λe can be set to 1 or become hyper-parameters. During the inference time, considering pe as the confidence associated to Early Exit e. We can decide to stop the procedure if pe>γ, where γ is a threshold decided by the user, assuming the exits are well calibrated. In a different way, it is possible to consider the entropy H[ye] of the predictions, measuring a broader level of uncertainty on the prediction:

$$H[y] = -\sum_c y_c \cdot \log(y_c) < \gamma$$

3.5 Dynamic Early-Exit Model

The previous schema provide a general strategy to build an early exit. However, it does not allow the model learn where to exit defining the exit strategy in a static way.

To overcome this drawback, we can insert a separate block, called Exit Selector, that chooses the best exit for each input considering its confidence level. Basically, the Exit Selector is a classifier that outputs the confidence related to each exit for a given input. If we refer to the confidence at exit e with c_e, we might train the network considering an aggregate prediction weighted with the relative confidence:

$$\tilde{y} = \sum_e softmax(c_e)\hat{y}_e, \quad \hat{y}_e = \text{prediction at exit e}$$

Our intention is to force the exit probabilities to be similar to some pre-defined probabilities by leveraging the KL-divergence and the exit selector is responsible for deciding the exit at inference time. The difficulty is to define a compatible approach both during training and testing since it is not possible to consider an argmax operation during training without occuring into gradient problems.

The solution to this issue is provided by the Straigh-Through Estimator that allows to consider the argmax during the forward pass and the original probabilities during the backward pass, letting the gradient flow only through the components that gave a contribution to the predicted exit. Nevertheless, this strategy can lead the network to never explore different exits, trapped into the initial prediction. The last element we need to introduce to face this problem is a differentiable sampling mechanism that provides probabilities p_e to sample as exit at training time. In practice, given the probabilities p_e, we sample from the categorical distribution $z \sim Cat(p_e)$. By using the soft selection strategy over the Gumbel softmax trick, we obtain the following formulation:

$$z = softmax\left(\frac{log(p_e) + g}{\tau}\right)$$

where τ is a temperature scale parameter that regulates how the softmax should approximate the argmax.

4. Result and discussion

We used different curves (Fig. 5) in order to evaluate the metrics of interest. It is important to remember that, in the specific case of MRI cancer images, we want to maximize the number of True Positive which means correctly classifying patients with the disease and minimizing False Negative, i.e. reducing the risk of not treating patients who are actually ill. Furthermore, by applying the Early-Exit solution, we want also to check the training time and achieve the best trade-off between training time and performance. Let's start evaluating the benchmark CNN model implemented without any Early Exit approach.

We can see in the Figure 5 the behaviour of the model with respect to the training and validation set. As expected, the training loss decreases very quickly while the validation loss has a certain amount of variability but after 15 epochs it decreases. Looking the other plots, we can see a slight overfitting just after 30 epochs and in general the performances are very good. In order to understand if the model is able to generalize on unseen data, we evaluate it using test set. In Table 1 is possible to see the performances of the model using the test set.

The NN has good performances overall considering the metrics that are in line with the results found using the validation set. In Table 2, the training time and the inference time are reported.

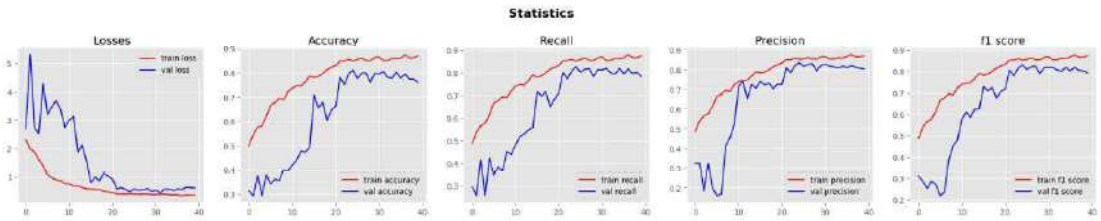

Figure 5: Performances Training and Validation data

Model	Loss	Accuracy	Precision	Recall	F1-Score
CNN (Benchmark)	0.534	0.773	0.831	0.762	0.795

Table 1: Performance Test data

Starting from this point, we discuss the results of the Static Early Exit Model which has a structure similar to the previous model. However, two early exits were includes after the second and the fourth layer as reported in Figure 6.

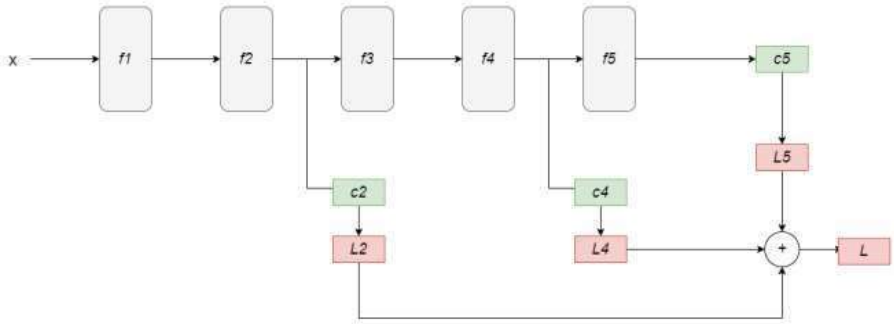

Figure 6: Early Exit Model Architecture, image inspired by Simone Scardapane's lectures

In this case, a threshold procedure is used to decide the exit in a static way and this formulation does not create any problem in the gradient flow. In Figure 7, we reported the performances obtained on test set using the model with Static Early Exit.

For this model, we keep trace also of the early exits results and the second early exit provides very good results.

However, this cannot be consider a general conclusion since we decided the threshold in a static way.

In Table 3 is possible to see the performances of the model on the test set that are in line with the previous model.

The time required for the test set is negligible, but we should consider that on large datasets this procedure could save a lot of time. In Table 4, the training time and the time during the inference phase are reported. It is worth noticing that in this case, the inference time can be bigger than the one seen for the baseline model. Even if this results might appear inconsistent, in really it makes sense. In fact, we are performing a bigger number of computations with respect to the baseline model given that it is not possible to distinguish a priori the exits for each input which makes the pipeline more sophisticated.

Model	Training Time (sec.)	Inference Time (sec.)
CNN (Benchmark)	801.275	0.267

Table 2: Training and Inference Time

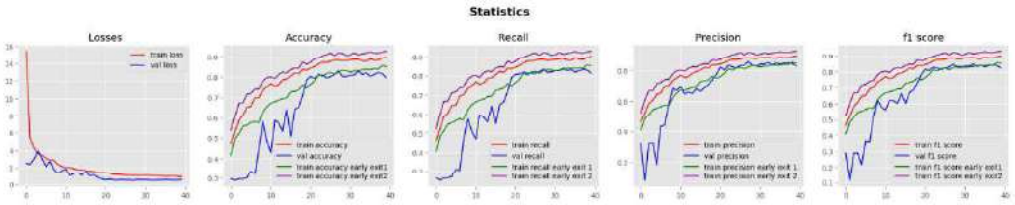

Figure 7: Performance Training and Validation data Early Exit CNN

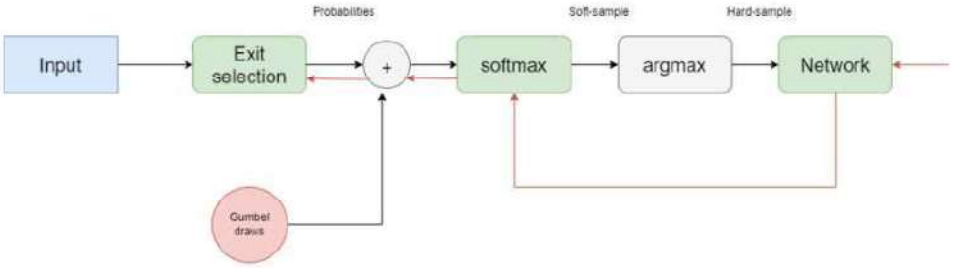

Figure 8: Gumbel Softmax Architecture, image inspired by Simone Scardapane's lectures

The second block is composed by the network itself (represented as the green network in the Figure 8) which takes the output of the early after the Gumbel Softmax Trick and the images. The model was implemented using masks and a matrix M that is initialized with zeros to store all the output in the correct position. This seems the most appropriate approach after having experimented with einsum and other methods that do not exploit the early exits intuition to its maximum. In Figure 9, we reported the performances obtained on test set using the model with Gumbel Softmax approach.

It is possible to see that the model did not reach an overfitting stage and all the metrics seem to have an increasing behavior. However, to obtain consistent results with the previous models, we decided to reach 40 epochs and then stop the training. In Table 5 are reported the results on test data and the percentages of samples exited for each Early

Exit. In Table 6, the training and inference time of the model are reported. It is important to note that the training time is considerably smaller than the one seen in the Static Early Exit. In fact, in this case, it is possible to extract the exits a priori due to the presence of the Exit Selector and this both simplifies the computations and reduces the time needed.

Model	Loss	Accuracy	Precision	Recall	F1-Score
CNN (Benchmark)	0.534	0.773	0.831	0.762	0.795

Table 3: Performance Test data

Model	Training Time (sec.)	Inference Time (sec.)
CNN (Benchmark)	801.275	0.267
CNN - Static Early Exit	2570.185	36.336

Table 4: Training and Inference Time

Figure 9: Performance Gumbel Softmax Model

Model	Loss	Accuracy	% samples in Exit 1	% samples in Exit 2	% samples in Exit 3
CNN - Gumbell Softmax	0.612	0.761	0.218	0.437	0.345

Table 5: Performance on Validation data

Model	Training Time (sec.)	Inference Time (sec.)
CNN - Gumbell Softmax	1147.030	1.079

Table 6: Training and Inference Time - Gumbell Softmax

5. Conclusion and future work

For both the Static and Dynamic Early Exit the computational time is longer. However, the benefits should be considerable in case of bigger datasets and models composed of several layers where deciding if one should exit early can save a good amount of time. In particular, the Static formulation forces the model to perform a large number of computation that can eventually lead to bigger computational time

in case of small model, like the one proposed in this paper, reducing the effectiveness of intuition behind the Early Exit. On the other hand, the dynamic formulation allows for a flexible decision process that effectively reduces the test time and, for this reason, it should be the preferred option given the results.

The purpose of this paper is to provide a comprehensive application to the world of neural networks featuring multiple early exits. We emphasize the advantages of these models, such as their heightened resilience to gradient issues and adaptability to advanced training and inference techniques. Furthermore, they offer a viable pathway to exploring alternatives to conventional back-propagation algorithms. Of course, there are different open questions. While these techniques have been applied to some extent in CNNs and RNNs, their effectiveness in modern neural layers like graph convolutional networks and transformers requires exploration. Moreover, implementing these networks in a distributed environment presents open questions regarding architectural constraints, accuracy and communication costs.

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The long stay of young women with the family: the role of social services

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Abstract: It is intended to study the phenomenon of girls' prolonged stay at the parental home, far beyond young adulthood. The theme under analysis is the female condition of young adulthood living with and dependent on parents well beyond the threshold age of 26-27 years old. In particular, the prolonged cohabitation will be considered together with phenomena of emotional dependence, social exclusion, and psychological discomfort. The area of analysis is the administrative subdivisions of Rome.

The main questions that will be faced are: a) how well does social services network of Rome's municipality deal with this phenomenon? b) When the phenomenon is intercepted by the social services, what kind of response does it produce?

At first, it is intended to review the scientific literature about the prolonged stay of young people in their parental home.

In a second phase, will be mapped the social services of Rome's municipality, to draw a precise picture about the coverage's level of users who are affected by this phenomenon - needy families, families with non -self-sufficient individuals, vulnerable families, daughters with psychological dependencies - and the type of services provided that directly or indirectly affects the contrast of this problem.

Keywords: transition to adulthood, youth, gender, social exclusion, psychlogical discomfort.

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1. Paperwork

Leaving the parental home is an important event for young adults and their families. The ways and timing of this event depend on various factors: cultural standards and social desires, economic conditions, and the expectations of everyone. It is now known that, by choice or necessity, young people tend to postpone their exit from the family home (Galland, 1995; Sabbadini, 1999; Dalla Zuanna, 2001; Barbagli et al., 2003; Buzzi et al., 2007; Livi Bacci, 2008; Istat, 2010; De Luigi, 2012). Thus, the age at which this event occurs is often advanced. According to 2011 data, Italy shares with Southern European countries the highest percentages of boys and girls (aged 18 to 34) who delay leaving their parents' home. These percentages are higher among men (67.9%) than women (56.4%) (Eurostat, 2011).

First, an explanation for the delay of the transition stages to adulthood, particularly of leaving the parental home, is the extension of education and formation circuits. In general, such extension leads young adults to grow up later compared to the past (Shavit and Blossfeld, 1993). Furthermore, to this day, it is girls who invest longer in human capital. (Cavalli-Galland, 1996). In fact, the educational level of young girls has increased over the generations and at a higher rate than their male peers.

However, the situation was quite different in the older generations. Among people born before the 1940s, just 25.7% of girls had attained a high school diploma, while the share of boys who had attained the same qualification was 34%. In the younger generations (those born between the 1970s - '84s), on the other hand, the share of girls who had attained a diploma (69.3%) exceeded that of boys (64%).

The same trend takes place in relation to the obtaining of a college degree: again, in the younger generations, the percentage of female college graduates (21.7%) exceeds the one of male (15.2%). In the older generations, instead, the percentages of female and male graduates were respectively 7.3% and 10.6%, reflecting the increasing participation of the younger in tertiary education circuits throughout the generations and that the share of female graduates exceeds that of men (Istat, 2014).

In countries such as Italy or Spain, women between the ages of 30 and 39 invest more in education, partially to try to mitigate gender differences in the labor market. In Italy, being a woman negatively affects the chances to reach the most qualified, stable, and well-paid jobs. In our country, unlike such as France and Germa-

ny, young women are way more disadvantaged. Even if they hold jobs with the same level of qualification, they receive lower wages than men (Giancola and Salmieri, 2016), this is the phenomenon called "gender pay gap".

On this point, it is interesting to note that incomes received do not differ that much in relation to the degree of employment qualification held by young adults. As if young people, particularly women, represent a subcategory of income and the real level of their qualification level is not considered (Giancola and Salmieri, 2016). If young people spend more years in studies, consequently they will enter the labor market later.

The increasing flexibility and de-regulation of the labor market may be considered an additional cause to the procrastination of leaving the family. These transformations, which have affected the labor market, have not equally affected all workers: young people and women have been the most damaged (Esping-Andersen and Regini, 2000; Barbieri and Scherer, 2005; Anastasia et al., 2011). So, women suffer a double disadvantage: as young people and because of gender inequality. In the labor market young people and women are part of the so called "outsiders" (Barbieri and Scherer, 2005). Insiders, in contrast, are those who are employed as permanent contract employees or self-employed, such as freelancers.

The insider/outsider distinction depends on both from the type of contract and from the associated system of social protections. Not necessarily, in fact, from a permanent contract corresponds job stability, as well as not necessarily a temporary employment involves job instability. What makes the difference is the social protection system and the uncertainties, experienced and felt, regarding income, stability, and continuity of employment.

In our country, for example, young people looking for a first job often do not have any unemployment assistance (Dell'Aringa and Samek Ludovici, 1996). Among those who are employed, on the other hand, the amount and duration of the various benefits differ considerably depending on the period, type and sector of work previously held (Gallie and Paugam, 2000). In Italy, the period in which people seek their first job is rather troubled as the links between the education/formation system and the labor market are extremely weak (Hannan et al., 1996). Thus, the transition from finishing school to entering the labor market becomes longer and harder: in 1988, 33.5% of all young people between the ages of 15 and 24 were unemployed. Moreover, 60% of the long-term unemployed are young adults seeking their first job (Istat, 1999).

The difficulties encountered in finding a job are exacerbated for young female workers: the gap between female and male unemployment rates is still quite high,

while the female employment rate, in its territorial specificities, continues to be quite low (Reyneri, 2009; Naldini and Saraceno, 2011).

In addition, when young people manage to find employment, the probability that the employment will be with an atypical contract is high. Another consequence of the flexibility and de-regulation of labor relations is precisely the increasing share of atypical contracts, such as fixed-term contracts or formation contracts, and the gradual reduction of permanent contracts (Bernardi and Nazio, 2005). Being hired on a fixed-term contract is even rarer for female young adults, especially those with low levels of education (Mencarini and Solera, 2011).

Due to the various difficulties related to the labor market, mentioned so far, young people are experiencing a double insecurity: economic and occupational insecurity. The first one is related to the uncertainty concerning their financial assets, while the second one is the insecurity condition experienced by the worker about the future developments concerning his or her employment position. Economic and occupational uncertainty not only affect the employment paths of young adults that, by the way, require longer periods of time to find work and stabilize their careers (Cammelli, 2005), but also the other spheres of their lives, such as the choice concerning leaving the family of origin.

In fact, young men, as well as young women, also tend to postpone their exit because of the various barriers to achieve job stability and economic independence. These difficulties experienced in the labor market led them to be partially or totally dependent by their parents. In addition, their life plans and ambitions suffer a major setback (Anastasia et al. 2011, Giorgi et al. 2011; Livi Bacci 2001; Mencarini 2006; Mencarini and Tanturri 2006).

Not surprisingly in our country, as well as in most Mediterranean countries, there are welfare state models characterized by a pronounced familism. According to this phenomenon, the state assumes the family as the main provider of welfare, limiting its intervention only to cases in which it is unable to respond autonomously to the needs of its members (Bernardi and Nazio, 2005). In these welfare models, therefore, the resources and means of the family are fundamental to support young people in their transitions to adulthood. The family, therefore, will try as much as it can to fill the gaps left by public institutions. The family of origin and social class of origin can be seen as social shock absorbers that can support and help young people on their paths to emancipation and housing independence (Cavalli-Galland, 1996).

However, families do not have the same capacity to help young people to become responsible and autonomous adults. In fact, those who experience conflictual rela-

tionships with parental figures are at a disadvantage compared to the rest of the youth population because they lack strong social networks, other than the family network, to rely on in case they want to leave the family (Cavalli-Galland, 1996).

Compared with the social class of belonging, on the other hand, as the social class of belonging increases, the transition to adulthood is progressively postponed. In this sense, the anticipators are the boys and girls, belonging mainly to the lower and middle social classes, who tend to become adults, thus, also to leave their families, quite early. In contrast, latecomers are those young people who belong to the wealthy social classes which tend to postpone the transition (Cavalli-Galland, 1996), continuing to cohabit with their parents for longer periods of time.

The reliance on family networks is also intensified by the Italian housing market, which is becoming increasingly selective and inaccessible (Cavalli-Galland, 1996). If in the 1960s buying a house required 2-3 times annual income, in the 1990s this ratio has risen to 5-6 times (Tosi, 1994). This means that, in Italy, the price of real estate has grown much higher than wages. This is a further confirmation of the progressive loss of purchasing power and more generally of the state of economic difficulties in our country.

The situation does not improve significantly considering housing rents. On this point, the "legge Equo Canone" was enacted in 1978, which was aimed at their regulation. However, this provision benefited, by reducing their rent, especially those families who already had a lease, and caused, as an undesirable effect, a reduction in the offer of houses for rent in the official market, promoting a black market. Public housing has also become extremely limited, advantaging, for example, those families who have been evicted, who enjoy priority access to public housing (Bernardi and Nazio, 2005).

Moreover, if we look at the components of social spending in our country in the period 2010-2015, we see that the share of resources allocated to housing and social exclusion (0.8%) is significantly lower than the European (EU-15) average (4.1%). On the contrary, a large part of the social spending of the Italian welfare system is allocated to protection from risks related to old age (58.9%), which is somewhat higher than the EU-15 average (45.2%). This means that, in Italy, social protection of risks typical of old age takes place at the expense of other needs and necessities peculiar to other phases of a person's life cycle, such as housing hardship, and youth unemployment. If there is a lack of opportunities to achieve personal independence, the family represents the only safe place and an important resource for young people against the major risks of growing up. However, the family can quickly move from being a refuge to a trap, inhibiting their intentions to

leave the parental home and blocking opportunities to emancipate themselves (Ferrera, 2019). Youth policies should face these issues and support young people in their transitions to adult life.

In addition, living for long periods of time in a state of dependence (or semi-dependence) on parents, and meanwhile having the opportunity to implement youthful patterns of behavior and lifestyles, leads young people to remain in a comfort zone from which it is later difficult to exit. There would be a risk that they would end up viewing youth as an acquired right to dependence, disincentivizing their impulse to grow up and, therefore, to empower themselves, involving consequences to both them and subsequent generations (Cavalli, 1997).

It could be hypothesized that a proportion of young people prefer to stay in the safe place with their parents and maintain purely youthful lifestyles, rather than attempt to emancipate themselves. This might appear very beneficial to them in the short term; however, as time passes, it may cause them severe damage in the transition to adulthood. Indeed, if young people postpone opportunities when it is possible to accept adult responsibilities, it will be increasingly difficult for them to emancipate themselves and achieve personal and housing autonomy.

Italian familism and Catholic education have had an influence on young people's tendency to delay their transition to adulthood. In fact, more and more young adults continue to cohabit with their parents despite the completion of their studies and the stable entry into the labor market. This occurs as the impulses for personal autonomy are weak, both on the part of young people and their parents. Moreover, among those who still live with their parents, the percentages of workers who keep their earned money for themselves are growing (from 36% to 52%), while those of young people who spend all their earnings on the family ménage are decreasing (from 22.9% to 8.8%) (Cavalli-Galland, 1996). In addition, among the younger generation, more and more young people are deliberately choosing to stay at home with their parents and remain thus looking for opportunities which are in line with their trajectories and perspectives, rather than settling for the first work proposals they receive (Cavalli-Galland, 1996).

However, there are others who believe that the delay in leaving the parental home should be traced back to the progress of the Italian family, which took place in the second half of the last century. Such progress allowed parents and children to live together more peacefully. More precisely, young adults have managed to obtain for themselves considerable spaces of autonomy within the family, such as having a room whose access they can control and decide on its furnishing. What is more,

young people are less and less required to give explanations about their friendship and romantic relationships and outings (Cavalli-Galland, 1996).

Familism and Catholic tradition have also had an influence on the reasons why young people leave the parental home: in 2009, in a sample of young Italians (aged 18 to 34), marriage was the main reason for leaving (29.2%), followed by work reasons (21.6%), to start a cohabitation (14.8%) and study reasons (3.9%). Notably, the quota of women who left the parental home to enter marriage (31.7%) exceeded by 4.6 percentage points the quota of men who made the same choice (27.1%) (Istat, 2014). These differences between men and women are also related to divergent paths into transition to adulthood. In fact, women's timing in the past was very early as they tended to stabilize through marriage, without necessarily facing the stage of entering the labor market (Cavalli-Galland, 1996). Hence, they were mainly assigned a role of caring and managing the family environment.

For men, on the other hand, starting a job was crucial to being able to get married and form a new family (Cavalli-Galland, 1996).

However, over the years the situation has been significantly transformed as young people's motivations for leaving the parental home have changed through time. The variation of motivations behind the exit is caused by the influence of cultural and economic factors (Istat, 2014). Since the 1970s important transformations have affected our country: for example, the organization of the family, the welfare system, and the labor market (Esping-Andersen, 1999; Mayer, 1994; Livi Bacci, 2008), which have occurred in the ways mentioned at the beginning of this paper. We should also add to these transformations the gradual increase in the population's education levels and the gradual decline in the influence of the Catholic religion.

As result of these transformations, the percentage of girls who decide to leave the parental home to continue their education has significantly increased, even surpassing the share of boys who have followed the same path. Specifically, 12.7% of those born between 1975 and 1979 revealed that they had left home for study by the age of 30, compared with 8.7% of their male peers. The quotas of girls who left home by the age of 30 to experience more freedom and autonomy are also increasing, despite being still lower than those of young men.

In general, young people, whether females or males, who move away from their family, come from families with high human capital (whose father has a university degree) and show higher levels of education (Istat, 2014). So, if girls invest more in education, they would be more likely to leave the parental home for reasons unrelated to marriage and formation of a new family. Among those born after the sec-

ond half of the 1970s, marriage stops being the main reason behind leaving the parental home, though it remains one of the most frequent reasons (Istat, 2014). Therefore, the transition paths to adulthood for boys and girls have started to become increasingly similar. Both work and study, as we have seen, have gradually characterized the female experience as well. At the same time, however, it has also been said that employment, its duration, wages, and future expectations become more uncertain for both. Partly because of such uncertainties, young people tend to delay leaving their parents' home permanently (Blossfeld et al., 2005; Schizzerotto and Lucchini, 2002).

Despite the growing similarity between female and male transition paths to adulthood, as anticipated at the beginning of this article, young adults in Italy tend to leave the parental home much earlier than their peers. In 2013, the percentage of boys (25-29 years old) still living with their parents (72%) was higher than the percentage observed in girls (55.9%). Similarly, even in 2022, the percentages of young people who had not yet left (76%) were higher than those of girls (65.7%). So, even though between 2013 and 2022 the gap between boys and girls has narrowed, it is still young girls who leave the parental home earlier (Eurostat, 2013; 2022).

Although this trend exists, the objective of this research work is to analyze the condition of those young women who prolong their stay at the birth home way over the 26-27 age range, partly due to issues related to social distress, psychological distress, and emotional dependence. The empirical research will focus precisely on this type of young people and will have as its area of analysis the administrative subdivisions of Rome. The main questions that will be faced are: a) how well does social services network of Rome's municipality deal with this phenomenon? b) When the phenomenon is intercepted by the social services, what kind of response does it produce?

To provide answers to these questions, a mapping of social services in Roma Capitale has been carried out. Organizational charts of the fifteen municipalities of the capital and of the "Dipartimento Politiche Sociali e Salute" were made since, despite being located only physically in Municipality I, it is responsible for planning, coordinating, and monitoring the social services provided throughout Rome, both at central and territorial levels.

In each organizational chart, the managers of all offices belonging to the social, educational pedagogical and psychological-health areas were identified. The purpose is to conduct interviews with several professional figures who hold the posi-

tion of responsible, coordinator or, simply, who have several years of experience with the phenomenon under investigation.

Through mapping and subsequent interviews, it is intended to draw an accurate picture about the level of coverage of users who are included in this phenomenon, for example: disadvantaged families, families with non-self-sufficient individuals, vulnerable families, or daughters with psychological dependencies. In addition, it is intended to identify and describe the type of services, if there are any, which are provided directly or indirectly affect the combating of the issue.

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Diversity and inclusion of work-spaces: evidence from the European companies

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Abstract: Since the end of the Second World War, human rights have become an important issue for international organisations and governments. However, the advent of globalisation has highlighted the relationship between human rights and economic interests. Moreover, multinational corporations and other companies have sacrificed people's freedom to pursue economic goals. For this reason, international organisations have established standards to ensure respect for these rights reporting them in several documents. The right to equality and non-discrimination is one of the principles underlying the European Union and other countries. This principle is implemented in all areas of society, especially in the economy, as defined by the International Labour Organisation. Several international labour standards require companies to promote equal employment and occupational opportunities and to avoid discrimination based on race, gender, language, disability, opinion and birth. However, sometimes companies violate this principle and engage in unethical behaviour, such as unequal pay, hostile work environments or lack of diversity. Despite the great relevance of the topic, only a few papers have analysed the promotion of diversity in corporate environments and research on this topic is still in its infancy. This paper aims to fill this research gap by analysing the causes and symptoms of diversity and inclusion in European companies, using a quantitatively oriented methodology based on secondary data. The implications of this research are twofold. First, it aims to contribute to the current literature on diversity and inclusion as a response to discriminatory behaviour in European companies and to provide insights that can enrich future

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research on this important topic. Second, the article seeks to identify practical implications for managers, companies, governments and international organisations. By identifying the factors that lead to the promotion of diversity, recommendations can be made to promote inclusive practises, improve diversity and foster a culture of equality.

Keywords: human rights, equality, workspaces diversity and inclusion, workforce, multinational corporations.

1. Introduction

After the horrific events of World War II, several organisations assigned responsibility for protecting human rights to states, while corporations have only been considered direct actors in human rights violations since the 1970s [Wooten, L. P., James E. H., 2004]. Human rights (HR) are defined by Wettsteinet al. [Ullah, S., Adams, K., Adams, D., Attah-Boakye, R., 2021] as "inalienable fundamental rights to which a person is inherently entitled simply because he is a human being". According to the ILO [ILO, 2021], an organisation founded in 1919 to establish labour standards, policies and programmes for decent work, there are four fundamental rights in the workplace: the elimination of forced labour, freedom of association, the abolition of child labour and the elimination of discrimination in respect of employment and occupation [Islam, M. A., McPhail, K, 2011]. Under these rules, member states and companies must promote and uphold the principle of equal pay and respect for all workers. This practise should be uniform and applied in all sectors [Lafarre, A., Rombouts, B., 2022].

Despite the introduction of various measures in the area of both hard and soft law, there are still documented cases of human rights violations, most of which are caused directly or indirectly by multinational corporations (MNCs). Only recently has the issue of corporate social responsibility (CSR) shed light on the social responsibility of economic actors, and among the various issues that fall under this broad topic, respect for human rights is usually assessed. The elimination of discrimination in the workplace is considered a fundamental pillar of human rights. Interventions in this area have been initiated by the UN, the ILO and the EU and usually take the form of soft law interventions that are not binding on companies [European Court of Human Rights, 2000]. Conversely, companies try to implement these guidelines in their actions and reporting, even if some of them choose to de-

fend human rights as a strategy to improve their brand image and reputation. Acceptance of diversity and inclusion is a core HR imperative. It is an important factor in employee satisfaction in the workplace and fosters an atmosphere where different perspectives and backgrounds come together to create innovation, creativity and shared progress. Although the issue of human rights is important in the global economic context, there are few studies and research on this topic. Therefore, the aim of this paper is to deepen this issue by answering the following research questions:

RQ: What aspects can influence the implementation of diverse and inclusive workplaces in a company? Are there differences between multinational and non-multinational companies?

The aim of this article is to fill this research gap by examining some of the determinants that lead to diversity and inclusion in European companies. The study also examines the differences between other companies and MNCs, which are usually considered the main perpetrators of HR violations. The rest of the article is structured as follows. Section two presents the main contributions from the literature. Section three defines the hypotheses and section four describes the methodology. Section five presents the results. Finally, section six presents the discussion and conclusions

2. Literature review

Defending HR is a crucial struggle for both society and business. However, research on this main concept is still in its infancy and few contributions analyse the factors that determine the defence of HR and diversity and inclusion. Existing research in this context can be divided into two main groups. The first group concerns theoretical and qualitative studies based on surveys or case studies. These studies mainly focus on the behavioural analysis of companies in relation to HR violations by observing the contrast between the defence of HR and capitalist principles. Ullah et al. [Rohden, L., 2023] show that MNCs from developed countries commit most HR violations, especially companies from the US and UK, which are closely monitored by Non-Governmental Organisations (NGOs) and activist groups. However, most companies that violate HR operate in an environment of impunity. One cause of uncertainty in the defence of HR is the ambiguity of the re-

lationship between HR and CSR. Obara and Peattie [Myers, R.H, 1990] attempt to monitor the bridge between HR, business and CSR, usually referred to as the "Great Divide" [Wettstein, F., Giuliani, E., Santangelo, G.D., Sthal, G.K., 2019]. They conduct a qualitative study based on semi-structured interviews with 22 companies in the UK. The results show that companies use their existing CSR knowledge and experience to engage with and talk about HR. In addition, companies tend to integrate existing CSR practises with HR strategies when expanding their operations abroad and mitigate risk when operating in countries with weak HR defences. Another critical challenge is the legalisation of HR accountability. According to the document's analysis, this goal can be achieved either by referring to international HR instruments or by including binding CSR commitments in investment agreements. To ensure that CSR obligations are enforced, they should be formulated as binding and substantive obligations, and their violation should not be exempt from investment disputes. In addition, a new dispute settlement system that allows victims to bring direct HR claims against investors needs to be explored [Maïnkade, B. F., 2023].

Other studies have looked at discriminatory behaviour and diversity management, which is one of the most important issues today. Wooten and James [Wettstein, F., 2012] describe the problem of discrimination in US companies because some of them still struggle with diversity management and have problems preventing discrimination claims. Rohden [Perkiss, S., Bernardi, C., Dumay, J., Haslam, J., 2021] states that laws are not enough to ensure diversity and inclusion in companies. Therefore, it is important to emphasise the profit maximisation involved and to create awareness and cultural background. The analysis shows some positive effects of implementing inclusion and diversity programmes, such as innovation, organisational health, financial success and positive behaviour. Deitch et al. [Deitch, E., Barsky, A., Butz, R. M., Chan, S., Brief, A. P., Bradley, J., 2003] examine the conceptualisation of discrimination in the United States and emphasise that recognising discrimination can be complex because it often manifests itself in ambiguous and unclear ways, making it difficult for individuals to understand the motivations behind certain behaviours. The results have shown that blacks are more likely to be discriminated against than white and that such mistreatment is associated with lower well-being regardless of ethnicity. In a study conducted by Bernstein et al [Bernstein, R. S., Bulger, M., Salipante, P., Weisinger, J., 2019], generative interaction theory was used to explore the issue of diversity and inclusion in the workplace. This approach is based on three fundamental concepts: diversity, inclusion and equity. Gender discrimination emerges as one of the biggest

challenges in promoting equality in today's society. Amaral [Amaral, R. V., Jaller, L. D., 2020] emphasises that despite the importance of trade and investment, discrimination should not be accepted. The private sector can make an important contribution to this issue, including investment by MNCs, to promote equal employment opportunities for all, especially women. Research suggests that teams with diverse perspectives and backgrounds tend to perform better than homogeneous teams, leading to higher innovation and adaptability, as well as lower turnover and absenteeism rates [Kogut, C. S., Fonseca, L, 2023].

The second group of articles includes quantitative analyses that explore the impact and potential determinants of HR adoption and disclosure. AlZahir et al. [AlZahir, S., Donker, H., Nofsinger, J., 2018] conduct a content analysis of codes of ethics published by HR organisations. They construct the HR Index (HRV) and find some country-level determinants such as the level of violence, economic inequality, quality of government, law and the role of religion. The results suggest that HR depend on time and culture. Flynn and Walker (2020) [Flynn, A., Walker, H., 2021] analyse the impact of the UK Modern Slavery Act on information published by UK companies belonging to two different stock indices. The results of the content analysis show the important role of institutional pressure and global supply chain division. Companies respond to sources of institutional pressure in different ways, with structural, policy and practical responses. Recently, Lopatta et al. [Lopatta, K., Tideman, S., Scheil, C., Makarem, N., 2022] conducted a study of the ongoing global debate on HR disclosure. The authors used a multi-theoretical framework drawing on legitimacy theory, stakeholder theory and institutional theory to explore this complicated issue. The results show that corporate visibility increases HR disclosure. The findings also predict that operating in a sensitive sector has a positive impact on corporate disclosure rates and that soft law in the country of incorporation has a positive relationship with HR disclosure, i.e., it is more effective than binding regulations. An important conclusion from the study is that companies still have difficulties in distinguishing respect for HR from CSR activities. This underlines the need for greater clarity and transparency in corporate HR policies and disclosures. Dobbin et al [Dobbin, F., Kim, S., Kalev, A., 2011] conduct a longitudinal study over 23 years to understand the organisational determinants of diversity programmes. The analysis shows interesting results in terms of the difference between internal advocacy, external pressures, the need for more diversity and organisational culture having the greatest impact on the adoption of diversity programmes. In our literature review, we found that only a limited number of articles use quantitative methods to examine the determinants of corporate HR

practises. This research gap led us to conduct a study aimed at observing the factors that influence a diverse and inclusive environment in European companies and MNCs.

3. Hypotheses development

Human rights have only been incorporated into business activities since the 1970s, and as a result, numerous standards have been established [OECD-UNSD, 2023]. The OECD, the European Union and the United Nations (UN), which includes the International Labour Organisation, are among the organisations that have played a role. These interventions are divided into hard and soft legal regimes, with the latter giving companies the freedom to experiment with the best policies and guidelines without binding obligations, leading to corresponding learning processes [Lafarre, A., Rombouts, B., 2022]. However, despite the adoption of international standards and national laws, certain companies have been able to commit human rights violations and discriminatory practises with impunity. According to Flynn and Walker [8], adherence to international human rights treaties is a way to exert institutional pressure and is positively related to human rights policies and modern slavery policies. Moreover, commitment to non-discrimination and human rights is often associated with adherence to international declarations and standards [Kuznetsova, Y, 2012].

Although international soft law principles provide important guidance, the implementation of diversity and inclusion programmes ultimately depends on the commitment and actions of individual companies. Nevertheless, international soft law principles can help create a more equal and inclusive business environment. Therefore, the following hypothesis assumes that the adoption of international soft law standards has a positive impact on corporate behaviour towards a diverse and inclusive workforce [Islam, M. A., McPhail, K., 2011].

H1: The adoption of international standards has a positive effect on diversity and inclusive workspace.

Despite the significant impact of racism and discrimination, some organisations still struggle with diversity management. Diversity management includes behaviours that promote inclusion and respect for diversity and requires policies, strategies, initiatives and training to integrate people with different characteristics [Wettstein, F., 2012]. Although there are international standards, companies must

go beyond compliance with the law and ensure equal access to employment, promotions and opportunities [Kogut, C. S., Fonseca, L., 2023]. However, some companies only adopt guidelines and standards to improve their brand image and reputation, while their actual practises do not conform to the principles of equality and diversity [Rohden, L., 2023]. Therefore, it is crucial to verify whether companies are implementing various diversity and equal opportunity goals and, more importantly, whether they are achieving these goals through concrete actions and long-term improvements in cognitive processing, skills development and organisational culture changes [Bernstein, R. S., Bulger, M., Salipante, P., Weisinger, J., 2019]. Organisations should not only set ambitious goals, but also actively work towards them by engaging in meaningful activities that promote diversity and drive positive change.

H2: The adoption of targets related to diversity and opportunity has a positive effect on the diversity and inclusive workspace.

MNCs have always been responsible for human rights violations in the pursuit of profit [Rohden, L, 2023], but these companies also face the challenge of complying with both national and international standards and codes [Flynn, A., Walker, H., 2021]. However, they are under pressure from various stakeholders, including non-governmental organisations, governments, international organisations (such as the UN) and consumers concerned about human rights and non-discrimination [Gray, R., Gray S., 2011]. Social media has raised awareness of the negative consequences of globalisation, and reputational damage is a significant risk for companies operating internationally [Panda, B., 2013]. Institutional and legitimacy theories suggest that MNCs respond to pressures by adopting policies, strategies and standards, not only to address external challenges, but also to ensure equality of opportunity within their internal operations [Islam, M. A., McPhail, K, 2011]. Thus, companies that operate in multiple countries tend to have a more diverse and inclusive workforce. As a result, we hypothesise:

H3: MNCs present a diverse and inclusive workspace more than other companies.

4. Methodology

To test the formulated hypotheses, we conduct a quantitative analysis with secondary data from the Refinitiv database for the year 2021. The analysis is based on 413 companies belonging to the STOXX 600, a European index comprising com-

panies from seventeen countries. We excluded 187 companies from the population due to missing data. The dependent variable of this study is the "DIR Score" (DIR), a comprehensive score provided by Refinitiv that illustrates diversity and inclusive workspace through workforce information. The independent variables are the "Fundamental Human Rights ILO UN score" (ILO), which assesses the extent to which a company complies with human rights conventions and takes soft law measures; "Target Diversity and Opportunity" (TDO), a dummy variable that has a value of 1 if the company sets diversity and opportunity targets for its workforce and 0 otherwise; and finally MNC, a dummy variable that has a value of 1 if the company is a multinational company according to the OECD Global Register [Obara, L. J., Peattie, K., 2018]. Control variables are added to improve the goodness of fit of the model. These include a company's profitability, expressed by return on equity (ROA), leverage (LEV) and firm size (FSIZE), defined by the natural logarithm of the number of employees [Lopatta, K., Tideman, S., Scheil, C., Makarem, N., 2022]. We decide to use the Tobit model as the value of the dependent variable is truncated and not continuous, ranging from 0 to 100. Therefore, the applied model is represented by the following equation:

$$DIR_i = \beta_0 + \beta_1 ILO_i + \beta_2 TDO_i + \beta_3 MNC_i + \beta_4 ROA_i + \beta_5 LEV_i + \beta_6 FSIZE_i + \varepsilon_i$$

5. Results of analysis

Table 1 shows the descriptive statistics relating to the dataset. The variance inflator factor (VIF) test shows that all values are less than 1.41, indicating that there are no collinearity problems [Myers, R.H., 1990]. Table 2 shows the results of the regression analysis. The test shows that the model is highly significant with a high Chi-square and a p-value very close to zero. The sigma value also indicates that the model is acceptable in terms of the purpose of the analysis.

Variables	Mean	Median	DIR	ILO	TDO	MNE	ROA	LEV	SIZE
DIR	59.74	59.50	1.00						
ILO	69.25	82.06	0.24 ***	1.00					
TDO	0.63	1.00	0.40 ***	0.16 ***	1.00				
MNC	0.22	0.00	0.32 ***	0.19 **	0.22 ***	1.00			
ROA	5.75	4.19	-0.02	-0.13 ***	-0.09 **	0.00	1.00		
LEV	114.71	82.20	0.12 **	0.05	0.08	0.00	-0.25***	1.00	
FSIZE	9.70	9.85	0.35 ***	0.32 ***	0.29 ***	0.40***	-0.20***	0.15***	1.00

*** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level

Table 1 - Descriptive statistics and correlation matrix

The results show a positive and significant relationship between the level of compliance with international conventions and the dependent variable expressed by the DIR score [Myers, R.H., 1990]. The results confirm hypothesis 1 and underline the importance of global soft law agreements in implementing measures to maintain and promote diversity and inclusion in the workplace. A positive significant relationship is also found between diversity and equal opportunity goals and the dependent variable, consequently H2 is accepted. The results show that the adoption of targets has a stronger impact on diversity and equal opportunities in the workforce than compliance with international standards. The third hypothesis (H3) is confirmed by the empirical results, as MNCs have a higher impact on the dependent variable than other companies. The relationships between the dependent variable and the control variables are all positive and significant, confirming the hypotheses made by Cahaya and Hervina [Cahaya, F. R., Hervina, R., 2019].

Variables	Coef.	Std. Err.	p-value
ILO	0.026	0.105	0.0110 **
TDO	4.882	0.711	<0.0001 ***
MNC	3.113	0.857	0.0003 ***
ROA	0.067	0.038	0.0729 *
LEV	0.005	0.003	0.0490 *
FSIZE	0.694	0.219	0.0015 ***
Cons	46.348	2.031	<0.0001 ***
Number of obs.	413		
Chi-square	153.930	*p-value* (1.14e-30)	
sigma	6.552 (0.23)		

*** = significant at the 1% level; ** = significant at the 5% level; * = significant at the 10% level

Table 2 - Regression results

6. Discussion and conclusions

The analysis provides valuable information on potential factors influencing companies' commitment to diversity and inclusion, with a focus on MNCs. According to the findings, it is crucial to focus on soft law measures and individual targets. In particular, the implementation of goals and targets has a greater impact on diversity acceptance than non-binding regulations. Moreover, there seems to be a difference between MNCs and other companies, as evidenced by better performance in terms of respect for diversity and opportunity. Although MNCs are often associated with human rights abuses, they have shown a greater commitment to diversity and inclusion, which helps to prevent discriminatory behaviour. This is probably due to increasing pressure from NGOs, governments and consumers to prioritise these issues.

The results of this study highlight some practical as well as theoretical implications. From a theoretical point of view, the findings support the idea that external frameworks and policies can play a role in shaping internal organisational practises. Furthermore, setting specific diversity and equal opportunity goals can drive organisational efforts to create a more inclusive environment and ensure equal opportunities for all workers. From a practical perspective, companies should therefore set clear targets if they truly intend to promote respect for human rights for workers, including through the adoption of international standards. At the same time, governments and international organisations should work together to enrich soft law interventions and create institutional pressure for companies to adopt human rights standards [Lopatta, K., Tideman, S., Scheil, C., Makarem, N., 2022; Rohden, L., 2023]. However, this research also has its limitations. First, there is a lack of data on specific policies and strategies used by companies to promote diversity and inclusion. Second, the use of cross-sectional data does not capture the evolution of this phenomenon over time. Finally, using the DIR score as a dependent variable simplifies the degree of acceptance of diversity in the workforce. Further research could use a longitudinal data approach or content analysis to explore this question further and provide other useful implications.

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Law in the Digital World

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Abstract: The advent of new subjects such as AI, robots, algorithms, cyborgs and even animals is radically redefining the boundaries and foundations of law. New relationships are developing between humans, machines and different forms of intelligence, leading to unprecedented legal relationships. The role and responsibility of those who design and program these new legal entities and the engineering artifacts themselves are becoming central, both in terms of the decisions made by these entities and in terms of possible harm or crime. We are beginning to think about whether and how to give these new realities the status of humans. The world is increasingly becoming a global village, with subcommunities possessing their own characteristics. This requires adaptation of laws and regulations to handle new forms and channels of communication. One new tool is the Blockchain protocol, which offers new forms of law and challenges the traditional idea of law as something other than protocol. The maxim "Code is law" has become increasingly relevant.
The intersection of ethics and law is more important than ever. The norms that govern our actions and reality in general must have ethical value. In the digital age, integrity and transparency are paramount, and the law must reflect these values. We are entering an era of radical legal change, fueled by the digital revolution and the emergence of new subjects of law.

Keywords: bridging of knowledge, awareness and self-determination, freedom and fundamental rights, by design

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1. Introduction

The advent of new entities such as Artificial Intelligences, robots, algorithms, cyborgs, is leading to a redefinition of the boundaries of law. New relationships between humans, machines and different forms of interactions are developing, arriving at unprecedented legal relationships. One then wonders what their status is and whether it is possible to configure responsibilities for them. The term intelligence, associated with the adjective artificial can lead astray, and therefore the first step consists in understanding the relationship between man and machine. The attempt that we try to make consists in the synthetic examination of the interaction of AI with man and, secondly, the study of the legal profile, i.e. the consequences of both a fusion between man and machine, and the attribution of a responsibility of the producers and developers of these technologies. However, it is necessary to keep the ethical principles and rules that regulate Artificial Intelligence as fixed points, because fundamental rights cannot be weakened or emptied of their guaranteeing force. And finally we try to provide solutions through the application of those principles that are part of the legal system, but also of some taken from information technology, such as the code is law principle. The Blockchain could in fact be a tool that allows you to review the way in which man and machine interact with each other through the incorporation of some rules of law, in particular immutable and incorruptible, in a smart contract that is executed automatically.

It is very complex to be able to give an exhaustive definition of artificial intelligence. It can be declined in at least three different fields that intersect with each other, namely philosophy, law and information technology[1]. The latter considers it as a set of different technologies for carrying out numerous activities, such as deep learning, machine learning and computer vision[2]. Philosophy, on the other hand, directs its study above all to the concept of human awareness, will and self-determination. These profiles do not play a secondary role, if one thinks even only of the scope of the art. 22 of EU Reg. 2016/679, which attributes the right to human participation in decision-making processes, i.e. the presence of human "super-intendence" in a decision making process. Certainly not secondary, even the profile

[1] Bublitz Jan C. "Might artificial intelligence become part of the person, and what are the key ethical and legal implications?", 9/11/2022, AI & SOCIETY, Springer, https://doi.org/10.1007/s00146-022-01584-y

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of ethics, but with the aspiration of the latter to want to provide guidance for people's concrete problems[3]. And finally, in the legal field there is greater attention to what artificial intelligence can actually do. Therefore the definition that is given is consciously generic, precisely to maintain neutrality with respect to what the consequences of its application may be in practice. So there is not one aspect that prevails over the other, but they are linked together, and it is interesting to understand how in part there is a mutual hybridization, above all how the law absorbs some open questions, some philosophical ones are reflected in the exercise of rights but also information technology. However, it should be noted the IT and philosophical aspects go beyond this paper and will only be partially addressed, nor will aspects concerning other disciplines such as medicine and neurosciences be analysed.

2. Artificial Intelligence and the human person

The natural person has rights and duties. It is a unitary center of attribution of juridical situations pursuant to art. 1, paragraph I, of the Italian Civil Code Similarly, the art. 6 of the Universal Declaration of Human Rights establishes: "Everyone has the right everywhere to have his legal personality recognized"[4]. Legal capacity is acquired at birth, it cannot be renounced or stipulated. The ability to act must also be considered. This is obtained with the completion of the eighteenth year of age, at least according to the Italian legal system, but it can vary from State to State. However, the achievement of this maturity, understood as consciousness and awareness of one's own actions and the consequences deriving from them, allows the person to carry out legal acts suitable for modifying one's personal and also patrimonial legal sphere. To understand whether the ability to act is intact or not, it is necessary not only to pay attention to the age of the subject, but also to the existence of pathologies, drug intake, integrity of the same and also maturity. So then we need to ask ourselves whether the devices that are inserted in the human body are or are not able to condition the human will.

However, with respect to the aspect of "merger" with the natural person of the chip, the art. 3, paragraph I, of the Charter of Fundamental Rights of the Union

[3] Lecaldano Eugenio, " Etica", 1995, La Filosofia, Le discipline Filosofiche, a cura di Paolo Rossi, III, Garzanti

[4] Bublitz Jan C. "Might artificial intelligence become part of the person, and what are the key ethical and legal implications?", 9/11/2022, AI & SOCIETY, Springer, https://doi.org/10.1007/s00146-022-01584-y

clarifies "[5]. Everyone has the right to his own physical and mental integrity". Therefore, at least from a legal point of view, the devices that allow the functionality of the human body can be considered to all intents and purposes parts of the same. In this sense, it is sufficient to think of the topic of BCI (Brain Computer Interface) which is now increasingly widespread, above all for its practical implications. These BCIs collect inputs from the human central nervous system and generate enhanced outputs over natural ones[6]. It should be noted that, despite some theories, Artificial Intelligence does not interfere with the human will. However, the scientific literature reports some important medical studies that demonstrate how some tools such as those that aim to reduce the effects of Alzheimer's can lead to hypersexualization in patients, very probably determined by electrical stimulation[7]. Although these electrical impulses do not decrease the human will, it is understood that they certainly have a physiological impact but, reiterating, not on the conscience. Either way, these devices replicate diminished or missing brain functions.

Andy Clark and David Chalmers theorize the "extended mind", or EMT, extended mind thesis, by virtue of which not only the mind or body, but also what surrounds them is part of the cognitive process. Beyond the thesis to be adopted, the value of the EMT is to highlight the importance of the interactions between the mind and what is outside, such as to determine a cognitive exchange, thanks to the support of AI. And in this way, consider AI as part of the human body, part of the person[8]. Consequently, the AI device is a part of the person. At least two major scenarios arise from this: the responsibility of AI and the protection of freedoms

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and human rights. It is necessary to ask ourselves about the properties of the hardware and the software that make up and allow the functioning of the AI. If the above is correct, it would not be possible for a company to own a "part" of a man, for example a limb. Yet the producer, according to the definition of art. 103 of the Consumer Code, the final device remains responsible for that specific good. Therefore, the scenario is described that the artificial intelligence in question has a malfunction, for example the chip does not work adequately to make the hearing impaired patient hear sounds. In this hypothesis, the basis of the guarantee that protects the buyer and transfers the breach of contract onto the seller to transfer an asset free from defects occurs. Liability for defects provides that protection must be provided to the buyer who must obtain the contractual result, i.e. the use of the asset for which it is intended. Therefore it seems possible to apply the principle enshrined in art. 1476, paragraph III, of the Italian Civil Code, incorrect execution of the translation commitment.This is also accompanied by the action of exact fulfillment pursuant to art.1470 of the civil code in order to guarantee the total satisfaction of the creditor's interest. In this case, the recipient of the artificial intelligence device. To this it should be added that in this panorama it is also possible to hypothesize the exercise of the reintegration action in a specific form, pursuant to art. 2058 of the civil code in favor of the injured party. So as to eliminate the consequences of damage suffered by the injured party thanks to a different performance than the original one. Therefore the action of exact fulfillment and the reinstatement in specific form are not adhesive, and should not be confused with each other. For the criminal profile, on the other hand, this is configured for liability for a defective product which can cause injury to a person. The case of substantive law may change, therefore the crime of culpable injury pursuant to article 590 of the criminal code could be set up. The Consumer Code[9] in art. 112 punishes the producer, where he places dangerous products on the market, unless it constitutes a more serious offence. To this is added the provisions of art. 104 of Legislative Decree. no. 2006 of 2005 which establishes: "The manufacturer places only safe products on the market. " This list also includes the responsibility of the distributor

[9] Producer is: the manufacturer of the product established in the Community and any other person who presents himself as the manufacturer by putting his name, trade mark or other distinctive sign on the product, or whoever refurbishes the product; the manufacturer's representative if the latter is not established in the Community or, if there is no representative established in the Community, the importer of the product; the other professional operators in the marketing chain to the extent that their activity may affect the safety characteristics of products

in point 6" The distributor must act diligently in the exercise of his activity to help guarantee the placing safe products on the market; in particular, it is required:

a) not to supply products whose dangers he knows or should have known based on the information in his possession and in his capacity as a professional operator;

b) to participate in the safety control of the product placed on the market, transmitting information concerning the risks of the product to the manufacturer and to the competent authorities for the actions of their respective competence;

c) to collaborate in the actions undertaken referred to in letter b), keeping and providing the documentation suitable for tracing the origin of the products for a period of ten years from the date of transfer to the final consumer".

In the case of particularly sophisticated tools, there is no doubt that the degree of diligence must be even higher. Secondly, the software code is written by a subject who enjoys ownership of the same under the Intellectual Property Code; in fact this particular "technical writing" is to be considered a literary work. Then, under the Berne Convention, the work cannot be altered or modified, but this implies a limitation of the person's freedom to dispose of his or her body, at least limited to the part of the AI. In short, the panorama is very complex because we have to ask ourselves if it is possible to apply to artificial parts that nonetheless make up the human body and are personified, the same discipline as a material asset and if these are the property of a third party, according to the considerations developed above[10].

3. Court of Jurisdiction

The most important problems originate from the legislative void. There is still the dilemma of using AI with opaque mechanisms, even with medical applications on patients. The doctor can use AI tools to make choices, but if the functioning of the AI does not comply with transparent rules, or generates a "poisoned" output, the question of responsibility arises[11]. The code of the ACM, Association for Computing Machinery, recommends that the decision-making process "be accountable and transparent towards all interested parties"[12]. However, doctors may incur pro-

[10] Bublitz Jan C. "Might artificial intelligence become part of the person, and what are the key ethical and legal implications?", 9/11/2022, AI & SOCIETY, Springer, https://doi.org/10.1007/s00146-022-01584-y

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fessional liability where their clinical judgment is not based on accepted leges artis and experience. On the other hand, whoever writes a code or determines the functioning of an algorithm is subject to very different rules[13]. The problem could also be analyzed in reverse. The doctor could explain why he chose to deviate from the result of an AI which, at least vox populi, is "infallible" in nature. As the Commission said in November 2017, it is important to have a horizontal approach and to submit the current regulations to scrutiny for their adequacy, it being understood that humans must be guaranteed control over intelligent machines[14]. It is understandable that these technologies can have multiple applications, and have a transnational nature. All the more reason this can be easily understood for the Blockchain which, by its nature, is distributed and made up of an always variable number of nodes. The multiplicity of legal systems and the fragmentation of the applicable rules has as a consequence the difficulty of identifying the competent forum, in the event of disputes or conflicts between different systems. It is very difficult to be able to provide exhaustive answers, since, at least at present, there are numerous application uncertainties.

However, able estabilished a baselines. Meanwhile, a first observation is provided directly by the White Paper by Satoshi Nakamoto[15], which espouses a sort of self-sufficiency of the Blockchain system also with respect to the resolution of conflicts, providing for 'routine escrow mechanisms'. And there may still be oracles that act as "arbiters" in the event of disputes, but the problem remains of the recognition procedures by the States[16]. However this is not enough to prevent duplication of jurisdiction. Therefore it is necessary to refer to the Treaty of Rome I to resolve the conflicts of laws applicable to a contract. The art. 3 of the Treaty identifies the criterion of the will of the parties, "The contract is governed by the law chosen by the parties. The choice must be expressed, or result in a reasonably certain way from the provisions of the contract or from the circumstances. The parties can designate the applicable law to the whole contract, or to only a part of it". This princi-

[13] Bublitz Jan C. "Might artificial intelligence become part of the person, and what are the key ethical and legal implications?", 9/11/2022, AI & SOCIETY, Springer, https://doi.org/10.1007/s00146-022-01584-y

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ple is then accompanied by the content of article 4 which identifies alternative selection criteria, where the will of the parties is lacking. For example, "the contract is governed by the law of the country with which it has the closest connection." The same principles can also be applied to smart contracts which do not have a contractual nature, as also said by their creator Nick Szabo, but are software which, given an input, return a specific output[17]. It is legitimate to think Arbitration is the most suitable instrument for resolving disputes concerning smart contracts, through an express provision agreed upon by the parties and thus regulating their relations[18]. The profile of transnationality in the event of the commission of crimes also deserves at least a mention. It reiterates how central the role of international cooperation is, aimed at the exchange of information, the necessary assistance between countries and the pursuit of common goals which tend to counter the commission of crimes such as terrorist financing and money laundering, above all with reference to the use of cryptocurrencies.

4. Code is law

It has therefore been understood how law and information technology interact and condition each other. In some cases this has obvious implications for ethics, we have seen this with the healthcare world for the implications for the protected good, but even justice has, over time, increasingly relied on technology. It is sufficient to recall the use of software to carry out research, to draw up deeds and also to computerize processes. At the same time, the trend towards the use of soft law is spreading more and more, above all to settle disputes between private individuals

[17] About ICO, there are two important case. The Kolassa case (Harald Kolassa vs Barclays Bank plc , C-375/13, ECLI:EU:C:2015:37) CJEU has provided that the consumer forum applies when there is a contractual relationship signed between a securities issuer and a non-professional. And other, case Lober (Helga Löber/Barclays Bank PLC , C-304/17, ECLI:EU:C:2018:701), CGUE clarified that in addition to the domicile of the investor, the jurisdiction was Austrian as there were other factors that linked the dispute to that State. The financial instruments had been purchased on the Austrian market; the supervisory authority which had provided communications regarding these financial instruments was Austrian and the place of signing of the contract was still Austria. The other precedent is the US Tezos case (rejection motion &source=hp_affiliate&medium=affiliate) For further information see Ortolani Pietro, " The impact of blockchain technologies and smart contracts on dispute resolution: arbitration and court litigation at the crossroads Uniform Law Review, Volume 24, Issue 2, June 2019, Pages 430–448, https://doi.org/10.1093/ulr/unz017

[18] Poncibo' Cristina, "Profili di legge applicabile e scelta del foro", in Blockchain e Smart Contract, a cura di Battaglini R. E Giordano M.T., 2019,Giuffrè Lefebvre

that have a transnational dimension[19]. The advent of tools, such as GPT chat, has given rise to the idea that the judgmental can be replaced by an advanced machine learning algorithm, on the basis of virtual operators who support a customer in his online shopping.

These phenomena are the symptom of a departure from state law. In this conception (already developed in China on an experimental basis) it gives more and more ground to individuals arriving at the paradox that technology could absorb the law, becoming itself not a mere aid but the instrument itself for the application of the law[20]. This can be summarized with the expression coined by Lessing -the code is law-. This scenario generates new challenges and, among others, a new vision of contracts. Already today, the object of the contract and its execution can be achieved directly by smart contracts, and these can also influence their scope, in fact, through transactions, it is possible to obtain greater rights of enjoyment of an asset or obtain advantages of use. However, a distinction should be made. Blockchain technology and consequently also smart contracts can implement the law, they can constitute a tool for crystallizing information or results (for example provided by the IoT) and therefore also for incorporating rules. On the other hand, one cannot ignore the opacity of some rules, evidently implemented unilaterally, such as by social media or by large multinationals, which allow themselves to steal information, or manipulate users thanks to unclear policies, also due to the inefficiency of systems which, in fact, are not yet ready to deal with the protection of rights in these contexts[21].

In this way, we could arrive at the paradox of the coexistence of standards, the result of a political debate, others that are the expression of softlaws (ISO, UNI, ETSI) and others, unilaterally imposed (such as by software houses) on which it is not possible to operate a serious check. Without a democratic confrontation between the different interests that can be involved in the technological application, without a balance of values and without ethics in the choices that are made, dangerous scenarios can be represented for those fundamental freedoms affirmed in

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years of struggle. Only with a serious and long process of hybridization of knowledge between jurists and technicians and, no less important, philosophers will it be possible to succeed in creating rules and programmatic principles suitable for protecting the interests of individuals and also of the community.

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The quality of life in the migratory path of unaccompanied foreign minors: horizon or perspective?

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Abstract: Protection and guardianship interventions in favor of unaccompanied foreign minors are often characterized by an approach aimed at providing a protective and sometimes emergency response, moreover conditioned by the time factor, which imposes, within the age of majority, an effort aimed at fulfillment of a series of bureaucratic procedures and the possible emergence and taking charge of elements of physical or psychological vulnerability. These aspects, undoubtedly priorities, risk saturating resources and catalyzing, in an all-encompassing way, the attention and efforts, both on the part of the system and of the minor himself. However, in the plots of the migratory path of unaccompanied foreign minors it is possible to trace other elements which, although they remain in the background, in fact have a decisive and longitudinal impact on the path itself, i.e. from the moment of departure until the desired achievement of a condition of social inclusion and effective autonomy. Among these elements, the individual's biopsychosocial well-being and her quality of life certainly stand out. Both aspects should be considered both as a horizon towards which to strive, trying to make this condition as stable and lasting as possible, and as a perspective, a key element through which to direct and articulate the entire educational and empowerment process of the minor.

Keywords: Unaccompanied minors; migrants; quality of life; psychosocial wellbeing.

1. Introduction

The public debate on migratory phenomena, as well as our collective imagination,

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tends to be characterized by a marked attention paid to the vulnerability of migrants, sometimes considered as a sort of leitmotif, which persists and inexorably accompanies the individual throughout his journey. This approach often also inspires and directs the modus operandi of insiders, generating heuristics that lead to attributing absolute prominence to vulnerability, so much so as to constitute, at the same time, a migratory antecedent and an intrinsic and inherent element of the experience itself. In this sense, vulnerability, understood as the cause and effect of the migratory condition, risks dominating both our gaze and the representation that the migrant may have of himself. This is even more marked when we are talking about unaccompanied foreign minors, who, within the large and heterogeneous migrant population, represent in themselves one of the most vulnerable categories of all.

Although the traumatic component, within the migratory experience, is in some ways irrefutable, it is equally true that this aspect runs the risk of becoming so prominent as to mark a furrow along which all the interventions and measures adopted, in particular in favor of minors who migrate without adult references. In fact, it is undeniable that the protection and care of unaccompanied foreign minors represent, for the Protection and Reception System, an extremely complex and sometimes difficult challenge, since the risk and vulnerability factors, both endogenous and exogenous , are often difficult to control and mitigate. Therefore, in the face of an effort of this magnitude and having limited time available, the concrete risk is that innumerable aspects are left in the background, less binding but which nonetheless have a decisive impact on the growth path of the minor, such as the development and the consolidation of individual resources and the quality of his life.

2. Discussion

In the context of taking charge and of any intervention in support of unaccompanied foreign minors, the quality of life represents, in its multidimensionality, an element that is far from negligible, however, declining and placing itself along different space-time dimensions: in the past and in the country of origin, in the present and in the host country, in the future and in a place yet to be defined.

With reference to the past, first of all, the importance that the quality of life assumes in terms of "migratory history" should be underlined. In fact, already in the preliminary phase of collecting the anamnestic and profiling information of the minor, it is important to acquire elements that help to understand the atmospheres that

characterized everyday life and the context in which the minor moved before his departure; at the same time it is appropriate to understand how much and in what way these aspects have been decisive with respect to the migratory motive and how much, in perspective, they condition its current and future path.

Exploring this dimension in the biography of unaccompanied foreign minors, aspects can emerge that acquire a significant predictive value, such as to define, in a clear and coherent manner, the attitude and predisposition of the migrants themselves: if on the one hand there are those who, as in most cases, they flee from situations of poverty, insecurity, violence and violation of fundamental rights, on the other hand there is a share of minors, albeit residual, who leave behind living conditions that can certainly be improved but which in themselves they are not perceived as situations of imminent danger or serious poverty. In this case, the migratory drive can be mainly attributable to a need for emancipation, to improve one's life and for redemption, for oneself and one's family, to an evolutionary impulse that has more the flavor of a challenge, with peers and with themselves.

It is evident that negative or traumatic antecedents can determine, in individuals who survive and flee from this type of experience, medium-long term effects and forms of vulnerability such as to make the process of reception and social inclusion particularly difficult. In these circumstances, interventions aimed at the protection and care of these minors cannot do without a gaze that also focuses on the dimension of quality of life, in the here and now but also in a longitudinal perspective. On the other hand, always with reference to migratory antecedents, it must be considered that, nevertheless, living conditions perceived or remembered as more "stable and favourable", if interrupted by the migratory choice, can act negatively in the present, almost as if they were "ghosts". , real black holes that constantly bring the migrant back, sequestering him in an idealized past and which activates a pervasive and paralyzing nostalgia. In such circumstances, the minor can draw a balance of his migratory experience decidedly negative, so as to assume, in the most extreme cases, a posture withdrawn on his own past and annihilate the vitality of the minor himself, to the point of compressing any possible form of resilience or planning. Therefore, even a markedly nostalgic emotional attitude, although it is, in some ways, physiological and inherent in the migratory experience itself, can trap minors in their past, making them resistant to any external and current stimulus. All of this can exacerbate a profound sense of failure and ineffectiveness, making the eventual return home and therefore to one's past profoundly ego-dystonic and unthinkable, as well as a project, present or future, in the host country. It is as if this determined a condition of psychological and existential suspension, giving the mi-

nor the sensation of being the creator and fully inside a sort of "migratory thud".

Furthermore, it is important to ask ourselves and recognize if and how much, in reference to the quality of life, the imagery we draw on or, better, the paradigms and indicators we are referring to are actually the same or at least converge in a coherent reference model . Furthermore, it would be appropriate to ask ourselves, with respect to any differences of perspective, how much this is attributable to the cultural component and background and to what extent it affects the subjective and experiential dimension of which each individual is the bearer. All this makes it clear that the idea of individual well-being and quality of life cannot be pursued and measured in an unambiguous and objective way. Therefore, the approach cannot and must not be dogmatic in any way. On the contrary, the issue of quality of life must be a "horizon" negotiated with the migrant, it must be an idea, a point of confluence towards which to bring together and harmonize contextual and contingent, social and cultural, existential and psychological. Starting from this assumption, trajectories of thought open up that generate questions, which, in turn, lead towards a mutual and respectful discovery of the other and, together with the other, hopefully trigger a conscious and courageous exploration of the "possible". . This must be an essential axis on which to base and articulate the educational relationship with the unaccompanied foreign minor.

In this regard, the questions to be asked are many and, among many, we could ask ourselves, for example: what are the elements on which the quality of life is based? Or, thinking about the journey of unaccompanied foreign minors, what is the demarcation line that allows us to distinguish between survival, adaptation to the context and a quality life?

First, it is important to recognize that these questions have no objectively correct or predefined answers; on the contrary, they should be considered as key elements that allow the Protection System to articulate its intervention in favor of minors, always keeping in mind that shifting and maintaining the focus on quality of life means assuming a different angle and perspective, longitudinal and dynamic, the only one capable of giving the minor effective protagonism. On the contrary, neglecting the quality of life dimension runs the risk that everything else disappears and the migrant himself is recognized only as a bearer of vulnerability and needs. In this case, the risk is that the "struggle for survival" and the possibility of being able to achieve tangible objectives and forms of success that guarantee the existence of the individual become the only thing that matters. This epic, almost heroic vision of the migration path, although it is close to reality and highlights the innumerable difficulties and the multiplicity of adverse factors with which unaccompa-

nied foreign minors are measured, focuses only on the extraordinary dimension of this path, that of "despite everything", putting everything that can be normal, stable and ordinary into the background. It is as if the migrant and the minor in particular must always demonstrate, to himself and to the system that protects and supports him, which side he is on, characterizing himself and placing himself in one of two extremes: vulnerability or resilience. This vision, sometimes rigid and dichotomous, can create suggestions and categorizations, generating roles and asymmetries, which end up crystallizing the helping relationships and hindering the real process of autonomy of the minors themselves. In this sense, resilience should not be thought of only as "the ability not to break" and, therefore, not to succumb to adversity but also as the ability to create and maintain self-protective conditions and strategies, which last over time and which guarantee the achievement of an effective condition of biopsychosocial well-being. Once again, it should be emphasized how much all of this enters, fully, within the educational process that accompanies minors along their journey, which leads them from acceptance to autonomy and which also passes through a profound and pervasive process of legitimacy. In this sense, legitimizing means, first of all, recognizing and restoring to minors a series of rights, which go even beyond the terms sanctioned by the New York Convention on the Rights of the Child2, such as for example the "right to the ephemeral".

Unaccompanied foreign minors are often overwhelmed by a series of tasks and requests of different nature: the family mandate and economic pressures, coming of age and the need to obtain the minimum requirements necessary for the continuation of the regularization process and autonomy; to this is added the need to guarantee economic and housing subsistence. All these aspects end up reinforcing in the minor an attitude characterized by a marked pragmatism, which often has distant roots, partly attributable to a cultural heritage, partly inherent in the very nature of the migratory path.

Added to all this is the fact that, in most cases, unaccompanied minors who migrate show a psychological and behavioral set-up that seems to be, at the same time, the cause and effect of an induced evolutionary passage, sometimes anything but natural. Drawing on the field of physics, it could metaphorically be stated that the migratory experience, in all its components, determines the abrupt evaporation of the infantile dimension in the life of the minor, triggering a sudden and simultaneous process of solidification of the adult component. This change of state, which almost always takes the form of an evolutionary artifact, has significant repercussions from a psychological point of view, even if often not very visible, as they are

diluted in the performative enthusiasm shown by minors and young adults themselves. Therefore, it is up to us, as professionals belonging to the Protection and Guardianship System of unaccompanied foreign minors, to try to defuse or at least to mitigate this process of adultization and "evolutionary adulteration", introducing an intermediate state passage, or guaranteeing that "liquid component" that puts dimensions considered ephemeral back at the center: play, beauty, creativity, sociality and all those aspects that do not bring concrete and immediate benefits but which restore quality to the life and everyday life of minors. All of this is extremely important because the pragmatism practiced by the "adulterated" adolescent generates addiction, both in minors and in the reception system, since it places everyone in a comfort zone in which everything is tangible, measurable and appreciable: the minor can demonstrate himself and his reference adults that he has obtained results in terms of self-sufficiency and the system, for its part, can demonstrate that it has fulfilled its mandate, having made the minor fully autonomous and performing. In fact, this arrangement seems to guarantee both parties the classic win-win, protecting themselves and clearing the field of all those aspects that could interfere or distract the minor from his priorities and inducing a sort of apnea in the latter. In this sense, the ephemeral becomes superfluous, futile and sometimes even disturbing. All this narrows the field of action, tracing a perimeter that contains and makes thinkable only what is useful or functional with respect to the achievement of concrete objectives. A posture of this type, in fact, risks compressing the mechanism of desire and it is known how much desire represents one of the main cornerstones on which the vitality of the adolescent is based. Therefore, as for the ephemeral, even the desire must be legitimized and thought of as an essential center of gravity of the educational actions undertaken in favor of unaccompanied foreign minors. Once again, this is a crucial step since, as René Girard1 states, the mechanism of desire is also based on an imitative process, which the author himself defines as "mimetic". Therefore, a "mediator" is interposed between the subject who desires and the desired object, i.e. a model with respect to which the individual develops an adhesion or even a form of idealization. This model can be a real person, an idea or a cliché. It is evident how much, especially with respect to migrant adolescents, this aspect assumes a decisive role: the spasmodic search for elements that give value and that shape a new identity that is still being defined, as well as the simultaneous lack of significant points of reference, makes the unaccompanied foreign minor particularly sensitive to the theme of "migration success" and to all those elements capable of restoring a heroic dimension to this form of self-affirmation. Therefore, the role of educators and psychologists who support minors

along their reception path is also to mitigate and guide this trend, through an educational process that leads the adolescent to negotiate with himself and redefine his own reference models and, consequently, to recalibrate one's desires.

3. Conclusion

Ultimately, it is important to recognize that the substrate on which all this is based is determined by an evolutionary drive that engages the migrant adolescent in a complex process of individuation and identification with a system of roles and values, to which to adhere and "belong ". It is precisely the sense of belonging that is one of the essential elements on which quality relationships and therefore a quality life are based. Through the relationship with the other, within a space that becomes significant, the individual experiences a reciprocity and a protagonism that reinforces his sense of belonging, understood as "being and being part of ...". Isn't this the ideal scenario we think of when we hope and work so that unaccompanied foreign minors can undertake a real path of social inclusion?

Therefore, it appears quite evident how much the issue of quality of life assumes an absolute centrality with respect to the migratory path of every unaccompanied foreign minor, permeating it in every phase: depending on who contemplates or pursues it, the quality of life can be a horizon to strive towards and which orients one's migratory trajectory right from the start, or a perspective through which to identify and pursue objectives that place the well-being of the individual at the centre, his effective and full self-determination.

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Communicating Sustainable Tourism in key of Social Representations: a Pilot Study on Instagram, Facebook and Twitter

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Abstract: Theoretical background. The contribution focuses on Sustainable Tourism in light of the Social Representations Theory. Social Representations (SR) are defined as systems of shared meanings, values and beliefs, symbols and emotions connected to collective memories and attitudinal dimensions related to social practices and actions that enable individuals to construct meaningful knowledge about the social reality.

Aims. The purpose is to analyse the communication about "Sustainable Tourism", identifying which type of post (written post, photo or video) is the most common among the hashtags considered, the words and the emoticons used in the captions on the Social Networks: Facebook, Instagram and Twitter.

Method. Through the use of six hashtags (sustainable tourism, ecotourism, responsible tourism, rural tourism, nature-based tourism, green tourism) the contribution analyses posts published in English on the three Social Networks in 2021. The analysis was made through the IRAMUTEQ software.

Results. The Descending Hierarchical Classification produced five thematic classes: introducing destination, anticipating the travel experience, moving from anticipation to the travel experience, focusing on ecotourism and responsible tourism… Following the definition of SR, sustainable tourism (as it emerges in the captions of the analysed Social Networks) includes the emotional and value dimensions. Moreover, the reconstruction of SR makes use of fascinating stories, sometimes sinking into local cultures and traditions.

Conclusions. This study condenses the thematic object of Sustainable Tourism and the interest in Social Networks. Serge Moscovici (1925–2014) only partially

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experienced the advent and diffusion of the Internet, but he had already provided an anticipatory proposal: the social scientist underlined the importance of investigating new phenomena of online communication by studying cyber-communication. Social Networks, moreover, nowadays, flank -and have partially replaced- those traditional meeting places, such as the Parisian cafés, considered by Moscovici to be real social laboratories for the production and transformation of SR.

Keywords: social network; tourism; quality of life; sustainability.

1. Introduction

Tourism is a source of opportunities for all societies as it is fundamental for their social and cultural quality of life (e.g., Uysal, Sirgy, Woo and Kim, 2016). This is even more true for the Mediterranean area, which has always constituted one of the most visited tourist destinations in the world (eg. Lanquar, 2011). Unfortunately, tourism can also contribute to challenge the sustainability of the planet (e.g., UN-WTO and UNEP, 2008). Developing sustainable forms of tourism could thus help in mitigating the prospected changes both worldwide and in the Mediterranean area (Farsari, Butler and Prastacos, 2007). Social sciences can contribute to this endeavor, by monitoring people's perceptions of sustainability in tourism (e.g. Clayton and Manning, 2018; see also Passafaro, 2020; Passafaro and Vecchione, 2022). The goal of our contribution is to report on a set of studies focused on the discussions on sustainable tourism as they emerge from the general population. In particular we analyzed the communications on sustainable tourism posted in the social networks through the lenses of the Theory of Social Representations.

2. Theoretical background

This contribution focuses on the theoretical framework of Social Representations (Moscovici, 1961/1976; Farr and Moscovici, 1984; Moscovici and Duveen, 2000; de Rosa, 2011; 2013a; Sammut et Al., 2015; Lo Monaco et Al., 2016).

Social representations have been defined by the founder of the Theory, Serge Moscovici, as "system(s) of values, ideas and practices'' (1973, p. xiii). A group of renowned scholars in the field has proposed the following definition to further clarify the term: a social representation is the ensemble of thoughts and feelings being

expressed in verbal and overt behaviour of actors which constitutes an object for a social group (Wagner et Al., 1999).

In the specific field of environment and tourism, the theory has a long tradition, starting from the milestones work of Milgram and Jodelet (1976), Milgram (1970, 1984), Milgram et. Al. (1972), Jodelet (1982). A broad research program has been initiated by de Rosa in the 1980s on "Place-identity and Social Representations of European Capitals in First Visitors of Six Different Nationalities". It has been developed over time in various lines of investigation interrelated between them: "field studies" (de Rosa, 2013b; de Rosa and d'Ambrosio, 2010, 2011) and "media studies" (cfr inter alia: de Rosa and Bocci, 2014a, 2014b, 2015; de Rosa, Bocci and Picone, 2013; de Rosa, Dryjanska and Bocci, 2017; de Rosa and Bocci, 2019). Following the "media studies", the research here illustrated moves from the analysis of websites to that of social media, also shifting the attention from European historical capitals to the natural and rural contexts, with an emphasis on the theme of sustainable tourism.

After all, although Serge Moscovici (1925–2014) only partially experienced the advent and diffusion of the Internet, he had already provided an anticipatory proposal: the social scientist underlined the importance of investigating new phenomena of online communication by studying cyber-communication (Moscovici, 1995). Social Networks, moreover, nowadays, flank -and have partially replaced- those traditional meeting places, such as the Parisian cafés, considered by Moscovici to be real social laboratories for the production and transformation of Social Representations.

3. The Social Representations of sustainable tourism in Italy

The pilot study here illustrated was carried out on data collected in English. The results will be compared with a parallel data collection focused on the Italian language (Metastasio, Pichierri and Bocci, 2021) realized with the same methodology. The results obtained on the data analysed in Italian revealed some interesting aspects regarding the communication about sustainable tourism, and namely:

enhancement of the territories even in times of pandemic;

the numerous references to the landscape understood as a natural landscape - so important after the experience of confinement - often also rich in traces of an artistic-cultural heritage that characterizes our country. These are extra-urban areas with a high landscape value in Italy, in which the natural environment predomi-

nates over the urbanized environment and where widespread historical traces remain (ancient routes and settlements); these are historical-cultural areas (Rombai, 2001) of rural-agricultural tradition which, in addition to civil settlements and some industrial zones, present elements of natural, landscape and cultural value of interest for sustainable and quality tourism, as opportunities for development and environmental protection (Martini and Buffa, 2012; Albanese and Bocci, 2019a,b).

Finally, an interesting fact emerged from the textual analysis. In fact, in all three thematic classes extracted from the Iramuteq software (Descending Hierarchical Classification) there are no words that lead back to the pandemic. The captions of the posts do not use terms such as "pandemic", "COVID", "coronavirus" or even verbs relating to the spread of the virus or which refer to possible restrictions, as if to indicate the search for environments where you can relax without thinking about the effects of the virus (Metastasio, Pichierri and Bocci, 2021).

4. The present study

Aims of the study

The aim of the study is to analyse communication through social networks as means of communicating tourism in terms of sustainability. The survey aims to understand how sustainable tourism is communicated through social networks (Twitter, Instagram and Facebook) after the advent of the pandemic (focus on the year 2021).

Data collection tools and strategies of analysis

Through the use of six hashtags (sustainable tourism, ecotourism, responsible tourism, rural tourism, nature-based tourism, green tourism) the contribution analyses posts published in English on the three Social Networks. The analysis was made through the IRAMUTEQ software.

The IRAMUTEQ software was used to analyse the data for the Descending Hierarchical Classification (Camargo and Justo, 2013), regarding to posts' captions. The Reinert's method, which is the method that was used, is part of the clustering category in the text analysis menu. The results are represented by a tree diagram, which is called dendrogram.

IRAMUTEQ considers utterances as the smallest part of the speech. It considers the vocabulary of a particular utterance as a relevant trace of the point of view of the speaker. The most meaningful utterances are called lexical world by Reinert which, in this context, is analysed in key of SRT.

5. Results

First overview

Among 697 posts: 482 were found on Instagram, 180 on Twitter and 35 on Facebook. 274 posts are related to the hashtag sustainable tourism; 219 to ecotourism, 80 to rural tourism, 47 to green tourism, 45 to nature based tourism and 32 to responsible tourism.

Among the words with the highest frequency we find “tourism” (freq. 281) and “sustainable” (freq. 168), together with “travel” (freq. 114) and “experience” (freq. 101), showing the strong interrelation between social representations and practices (de Rosa and Bocci, 2019).

Descending Hierarchical Classification

The Descending Hierarchical Classification is stable because the number of hapax (all those words that have a frequency of 1 are called hapax, i.e. they appear only once in the text) are respectively <20 % (7.05 of occurrences) and < 50% (49.30% of forms).

The dendrogram, which is the result of the IRAMUTEQ analysis, is composed of five thematic classes that are different because of the contents, even if they are related. In particular, class 1 is interrelated with classes 2 and 3, while classes 4 and 5 are interrelated between them.

Class number 1: Introducing destination

Class 1 shows that the relevant content comes mostly from the social “Instagram” (X^2 6.905), with a number of over 50 “likes” per post (X^2 7.16). The prevailing typology are “photos” (X2 10.123), above all “natural images” (X2 15.133) which, as we will see, characterize the landscapes. It is useful to remember that Instagram is a purely iconic channel in which images have an important representative function. The sentiment highlighted the use of emojis related to "symbols + smileys + travel places" (X^2 7.65), "symbols + objects + travel places" (X^2 7.183), "objects" (X^2 5.166) and "flags + objects" (X^2 4.704).

The geographical location, objectified in the light of the Theory of Social Representations for example by the use of flags, is enriched with the narration of territories and communities. Among the places mentioned we remember: "Bali" (X^2 14.368) "Italy" (X^2 8.542) "China" (X^2 7.183) "Iran" (X^2 5.673) ... The geographical location plays an important role; for example: “locate” (X^2 58.529) “east” (X^2 33.274) “situate” (X2 26.909) “surround” (X^2 25.258) “Km” (X^2 21.838) “north” (X^2 21.551) “location” (X^2 17.262) “southern” (X^2 15.33) “near” (X^2 14.889)… With regard to the narration of the territories, we recall for example the description

of landscapes rich from a naturalistic point of view ("natural" X^2 26.395) "river" (X^2 53.125) "valley" (X^2 44.869) "sea" (X^2 32.49) “rock” (X^2 25.627) “island” (X^2 20.532) “cave” (X^2 19.182) “coast” (X^2 18.261) “Mekong” (the longest and most important river in Indochina and one of the largest in Asia X^2 11.486) “stone” (X^2 23.042) … With regard to the narration of the communities, we recall for example: “village” (X^2 45.436) “town” (X^2 26.747) “city” (X^2 19.624)…

The story is enriched by the emotional component with generic terms such as: “rich” (X^2 34.667) “wonderful” (X^2 18.261) “unique” (X^2 18.144) “slow” (X^2 15.561) “sweet” (X^2 15.33) “serene” (X^2 15.33) “quiet” (X^2 15.33) “impressive” (X^2 10.721) “magnificent” (X^2 7.734) “peaceful” (X^2 4.192)… Among the examples of this class we find the post that refers to the travel proposal on the Mekong, which crosses six different countries and is the lifeblood of millions of people. Cruising the Mekong promises an immersive experience, completely new, of which the natural beauty around the river is not the only aspect to discover.

Class number 2: Anticipating the travel experience

Some keywords of the class pertain to the characteristics of social networks, such as: "like" (X^2 50.929) "comment" (X^2 30.181) "view" (X^2 7.684).

If in the first class, as we have seen, the narration includes the emotional component through the use of generic terms and the prevailing setting concerns broad contexts, in class 2 the narration anticipates the experience in specific tourist destinations. Among the different typologies, the "adventure" journey is privileged (X^2 8.907). This class illustrates the destinations between “dream” (X^2 17,667) and reality (“true” X^2 34,106). The destination, moreover, is enriched with elements of charm, belonging to the intangible heritage, such as the stories (“story” X^2 13,144) that sink into local cultures (“tradition” X^2 8,315) or “tell” (X^2 17,667) adventurous “rescue” (X^2 19.316) of characteristic animals. Animals are therefore sometimes the protagonists of the narratives that anticipate the travel experience: “turtle” (X^2 24.419) “elephant” (X2 24.419) “shark” (X^2 15.045) “camel” (X2 9.839) “wildebeest” (X^2 5,416)…leaving however an aura of mystery around the “unknown” (X^2 9,839) and what could “happen” (X^2 20,08).

The journey promises to be regenerating ("energy" X^2 6.636) for the "soul" (X^2 19.316); smiles (“smile” X2 44.139) in fact become contagious in this “atmosphere” (X^2 8.315) which evokes positive emotions such as “joy” (X^2 15.221) and happiness (“happy” X^2 4.29).

The experience will bring into play the various senses, involving sight (“look” X2 7.091; “looks” X^2 5.416; “watch” X^2 4.29) hearing (“sound” X^2 21.862) and taste (“culinary” X^2 5.416).

Also in the second class, as in the first, we register a significance of the social "Instagram" (X^2 10,281) with the use of “photos” (X^2 7,291) and specifically “natural images” (X^2 12,474) with a number of “likes” over 50 (X^2 4.046).

The sentiment highlights the use of symbols such as "flags" (X^2 13.656) "smiles + animals + symbols + flag" (X^2 10.02) "smiles + food and drinks" (X^2 10.02) "smiles + symbols" (X^2 5.416) and only “smiles” (X^2 4.289).

Examples of posts are those that talk about immersive experiences, such as the positive emotions felt by looking into the eyes of an elephant or the union with the spiritual energy radiated by certain mountain landscapes…

Class number 3: Moving from anticipation to the travel experience

The third class includes not only the anticipation of the experience, but also the travel experience itself.

In addition to “imagine” (X2 7,097) “offer” (X^2 8,899) “info” (X^2 7,097) “operator” (X^2 7,097) “reservation” (X^2 10,143) and “trip” (X^2 31,807), we find the words “ arrive” (X^2 4,684) “welcome” (X^2 14,966) with a series of activities that are proposed, emphasizing the relationship between social representations and practices (de Rosa and Bocci, 2019).

Eco-friendly solutions are mentioned among the methods of carrying out the "tours" (X^2 43.902): "walk" (X^2 43.85) "bike" (X^2 15.637) "foot" (X^2 7.097) "e-bike" (X^2 6.641) “kayak” (X^2 4.281) “ride” (X^2 5.488), some of which have already emerged in the research aimed at studying sustainable mobility in social media (Metastasio, Passafaro and Bocci, 2023 in press) through iconic and verbal channels.

The "outdoors" activities (X^2 14.359) refer to the “summer” season (X^2 37.057; "sunny" X^2 14.359; "hot" X^2 4.281). The class, like the previous one, refers to adventure tourism: "explore" (X^2 21.35) "adventure" (X^2 5.961), highlighting locations such as "lake" (X^2 15.726) "hill" (X^2 10.677) "waterfall" (X2 10.143) "park" (X^2 20.905). However, the historical-cultural perspective is not neglected ("historic" X2 14,359). The proposals concern different targets: "family" (X^2 40.56) “friend” (X^2 7.541) offering “safe” (X2 7.097; “safety” X^2 9.947 and “secure” X^2 6.641) and “comfortable” (X2 6.641; “comfort” X^2 10.758).

Also this class refers to sources from “Instagram” (X^2 29.245). As before, the social sees the presence of “photos” (X^2 8.654) with "artistic-architectural" (X2 5.745) and "natural" (X^2 3.943) images. Some posts in this class tell of adventurous combination of historical, cultural and geographical experiences in beautiful, unexplored preserved territories.

Class number 4: sustainable tourism

Several terms remind us that we are within Internet-mediated communication: “link” (X^2 53.912) “bio” (X^2 48.274) “index” (X^2 39.204) “mark” (X^2 14.773) “follow” (X^2 12,981) “blog” (X^2 4,669) “policy” (X^2 11,906) “YouTube” (X^2 8,91) “post” (X^2 8,647).

The class focuses on sustainable tourism with the terms: "tourism" (X^2 238.662) "sustainable" (X^2 173.248) "sustainability" (X2 36.787) "green" (X^2 20.23) "rewilding" (X^2 12.963) "ecotravel" (X^2 9.713) “climate” (X^2 8.089) “eco” (X^2 4.144).

The class also highlights broad strategic processes that are proposed in favour of the economy and for the recovery of the planet: "discuss" (X^2 22.754) "recovery" (X^2 19.484) "project" (X^2 18.666) "goal" (X^2 16.22) “update” (X^2 15.035) “business” (X^2 13.475) “Earth” (X^2 19.914) “Planet” (X^2 13.588) “understand” (X^2 12.015) “increase” (X^2 11.906) “priority” (X^2 12,963) “program” (X^2 9,846) “strategy” (X^2 9,713) “research” (X^2 9,713) “principle” (X^2 9,713) “importance” (X^2 9,713) “aim” (X^2 9,305) “challenge” (X^2 4,378) “growth” (X^2 8,91) “initiative” (X^2 6,184) “implement” (X^2 5,864) “reset” (X^2 9,713) “transformation” (X^2 9,713) “issue” (X^2 12,963) “globe” (X^2 8.089).

Different actors are involved in the process, also recalling institutional contexts: "industry" (X^2 23.74) "University" (X^2 4.378) "organization" (X^2 4.378) "Minister" (X^2 9.713) "EU" (X^2 8.835) "official” (X^2 6,184) “Community” (X^2 4,893) “State” (X^2 9,803).

The vast network seems to guide a resilient perspective of community practices with keywords such as: “resilient” (X^2 8,835) “collaboration” (X^2 16,22) “support” (X^2 12,302) “encourage” (X^2 6,739) “restart” (X^2 9.713) “accelerate” (X^2 9.713).

Broad spatio-temporal views are highlighted:

-the international context refers to "Europe" (X^2 26.774) "European" (X^2 18.205) "UK" (X^2 6.184) but also to "Africa" (X^2 8.215);

- despite the difficulties, connected to the pandemic period ("pandemic" X2 15.035; "Covid19" X2 5.864 and "Covid" X^2 4.378) and closely linked to the "present" (X^2 15.035) the class offers a glimpse into the future with terms such as "future” (X^2 48.987) and “tomorrow” (X^2 8.91).

In this class the most important Social is “Twitter” (X^2 124.211). The data is in line with the purpose of the social which is to disseminate news, taking the form of a micro-blogging capable of conveying short messages but with a high informative value. Even the images confirm the professional nature of this thematic class; in fact we find a large presence of institutional images in the "poster" format (X^2 64.828) and images classified as "not applicable" (X^2 10.108) as articles without images are often present on Twitter. Furthermore, the number of “likes” is low, up

to a maximum of 20 (X^2 60.324); this seems to confirm the type of interaction that characterizes Twitter. The type of source, in line with the emerging social, appears to be the “text” (X^2 51.077), while the “comments” are persistent (X^2 38.707).

For example, some Tweets underline the importance of including environmental sustainability within the Recovery Plan or highlight how, in the post-pandemic recovery, sustainable tourism could help to build a cleaner and fairer future, while traditional models need a reset.

Class number 5: responsible tourism

The fifth class returns to the value of sustainability in favour of the environment with keywords such as "environmental" (X^2 61.888) "environment" (X^2 60.146) "environmentally" (X^2 6.18) "ecotourism" (X^2 5.659).

The importance of the "low" (X^2 23.472) "impact" (X^2 55.705), the "effort" (X^2 19.124) is highlighted with terms that indicate social practices of "conservation" (X^2 86.055; "protection"; X^2 29.334; "preserve" X^2 18.405; "protect" X^2 15.076; "safeguard" X^2 14.623; "conserve" X^2 14.062; "conservancy" X^2 5.23) and promotion (with terms such as "promote" X^2 12.589; "improve" X^2 33.1; "regenerate" X^2 5.23) of the "biodiversity" (X^2 28.267), bringing "benefits" (X^2 57.626) to the "ecosystem" (X^2 47.276) to the "community" (X^2 44.05) to the "heritage" (X^2 24.341). The keyword "respect" (X^2 9.506) highlights the value dimension.

Among the locations we find "Australia" (X^2 18.728) and "Indonesia" (X^2 10.492) among the types of holiday the "safari" (X^2 17.639) is mentioned; in fact, among the settings we identify “wildlife” (X^2 4.597) “forest” (X^2 7.598) and “rainforest” (X^2 4.626). Some terms refer to fauna: “bee” (X^2 19.517), “whale” (X^2 11.039) and “chicken” (X^2 5.23). The analyses show the presence of the “Facebook” channel (X^2 9.1).

Some posts encourage change, underlining how a little change in our way of life can produce a great impact to the environment.

6.Conclusions and future perspectives

The Descending Hierarchical Classification produced five thematic classes: introducing destination, anticipating the travel experience, moving from anticipation to the travel experience, focusing on sustainable tourism and responsible tourism… The sequence seems to propose the different scenes of a thematic movie.

Following the definition of Social Representations, sustainable tourism (as it emerges in the captions of the analysed Social Networks) includes the emotional (classes 1 and 2) and value (class 5) dimensions, together with the social practices

(classes 3, 4 and 5).

As we have already found in the analyses conducted on the Italian data (Metastasio, Pichierri and Bocci, 2021), we have registered the enhancement of the territories even in times of pandemic and we have found references to the natural landscape and communities of cultural value of interest for sustainable and quality tourism (first three classes). Moreover, the social representations of sustainable tourism here make use of fascinating stories, sometimes sinking into local cultures and traditions (class 2).

However, contrary to what was found in the study on Italian data, here we find references to Covid-19 and the prospects for resilience (class 4).

It is our belief that the psycho-social approach adopted in terms of Social Representations has provided useful information to capture and analyse significant conversational passages of conversational co-production between social network users. Future studies could compare posts collected in the pre-COVID-19 period. The research could also be continued by comparing the data emerging from this survey with more substantial data collections, eventually divided by social media.

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A Review on Machine Learning-based frameworks for population changes modeling

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Abstract: The last 30 years have been an exciting time in the history of mortality forecasting. During this period, innovative methods have been constantly proposed, contributing to the ability to anticipate population dy namics. This heightened research activity is the result of the intense adoption of statistical methods, which have built solid foundations for the evolution of mortality forecasting. Nevertheless, forecasting future lon gevity is not straightforward, and accuracy depends on the particular situation or trends. Indeed, it may be years before new techniques can be fully evaluated; thus, the accuracy of population projections should be regularly tested to ensure evidence of improvement. Researchers appear to be more focused on making technical progress in methods than on minimizing prediction errors.
This review aims to collect new insights into the analysis and forecasting of human longevity using recent innovations in deep learning. We will trace the short history of the machine and deep learning for population indicators, we also attempt to disentangle how deep learning may help researchers and practitioners in that field.

Keywords: machine learning, social indicators, longevity.

1. Introduction

Monitoring population changes is a crucial challenge for the public health system, governments, and pension schemes. In order to face this challenge innovative mathematical models have been proposed to get even more accurate predictions in

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order to anticipate these dynamics.

The last decades have been an exciting time in the history of mortality forecasting. During this period, innovative methods have been constantly proposed, contributing to the ability to anticipate population dynamics. This great research activity is the result of the intense adoption of statistical methods, which have built solid foundations for the evolution of mortality forecasting.

There are prominent models in the longevity analysis, and particular milestones in the actuarial field, such as CBD, PLAT model RH. Specifically, Cairns, Blake, and Dowd (2006)[1], suggest that once a mortality model has been estimated, it is important to check the criteria against which a model can be assessed, such as:

(a) Long-term dynamics under the model should be biologically reasonable,

(b) the robustness of predictions w.r.t. the ages and historical mortality trend.

(c) The model should be straightforward to implement using analytical methods or fast numerical algorithms.

These features are crucial for researchers and practitioners, in order to get reliable assessments in the evaluation of annuity products or for pension systems sustainability.

Nevertheless, forecasting future longevity is not straightforward, and accuracy depends on the particular situation or trends. Indeed, it may be years before new techniques can be fully evaluated; thus, the accuracy of population projections should be regularly tested to ensure evidence of improvement. More recently, different authors suggest the adoption of machine and deep learning frameworks to estimate and predict mortality surfaces [Nigri, A., Levantesi, S., Marino, M., Scognamiglio, S., Perla, F., 2019; Nigri, A., S. Levantesi, and M. Marino, 2020; Nigri, A., S. Levantesi, M. Marino, S. Scognamiglio, and F. Perla, 2019; Nigri, A., Levantesi, S., Aburto, JM, 2020; Perla, F., R. Richman, S. Scognamiglio, and M. Wuthrich, 2021; Richman, R., and M. V. Wuthrich, 2021; Sevcikova, H., Li, N., Kantorov´a, V., Gerland, P., and Raftery, A.E., 2016; Scognamiglio, S., 2022]. This approach has really taken off in the mortality literature, thus, through this review, we provide an overview of the state of the art on the adoption of machine and deep learning tools in the field of population studies, with a specific focus on longevity analysis.

2. Machine and Deep learning modeling

In the growing literature on machine learning applications to mortality models, we

can outline 3 areas of application: i) Integration; ii) Forecast, iii) Indirect estimates.

Integration.

In this approach, the basic idea is to include a deep learning model as the integration of the mortality model. One of the most suitable mortality models is the Lee Carter [Lee, R. and Carter, L., 1992], leveraging the integration approach is it possible to preserve the interpretability provided by the Lee Carter parameters. The related literature shows the use of Long Short-Term Memory (LSTM) (Hochreiter, S., Schmidhuber, J. 1997), a specific neural network used to predict sequential data. It was a better alternative compared to Lee-Carter ARIMA.

Nigri et al. 2018 introduced as first this approach applied to mortality, however, this paper suffers from important drawbacks. The main point refers to the long fitting period, indeed, the time step was too long in order to achieve a reliable prediction of mortality age structure. More recently, authors, improve this work by proposing an evolution of this framework, shortening the estimation period and adding the prediction intervals using bootstrap methods.

Prediction.

In this approach, authors predict mortality evolution by working on the ages time series. They used deep neural networks with embedding layers and convolutional neural networks, typically used in image recogni tion. This approach has great potential and one of the prominent approaches refers to the work by Scognamiglio (2022) [Scognamiglio, S., 2022] in the Astin journal, “Calibrating the lc and Poisson LC models via NN”. In this paper, the author proposes an Lee - Carter neural network using a specific scheme called a locally connected neural network. In this case, the main criticisms refer to the lack of an actual autoregressive scheme. Indeed, the author work in the classical machine learning setting using a train set to get model parameters and test set as out of sample. They also used a single fitting period, but multiple rolling windows would be recommended to improve the backtesting exercise. On the other hand, this framework allows working in the multi-popula tion dimension very easily.

We can briefly cite another contribution of the LSTM application on summary demographic measures, spe cifically simultaneous life expectancy and e-dagger forecasting, at birth and age 65 and multi-population forecasting of life expectancy at birth (see, e.g., [Nigri, A., S. Levantesi, and M. Marino, 2020]).

Indirect estimation.

Reliable predictions of age-specific vital rates are crucial in demography, several drawbacks are common, however. Indeed, the lack of reliable data or stochastic

variation in population counts at a high disaggregation level, made summary demographic measures appealing compared to age specifics one, to model and predict using multiple approaches. In the study of mortality forecasting, a key advantage of modeling summary measures like life expectancy at birth is that the predictive model deals only with a single indicator that summarizes the overall level of a demographic index over time, instead of modeling a single time series of rates for each age simultaneously (e.g. Lee-Carter). Although the use of summary measures as an indicator to forecast is appealing, estimating age-specific vital rates is needed to analyze demographic patterns at dif ferent ages. This reconstruction is not straightforward.

According to the UN manual, the term "indirect" qualifies the demographic estimation technique that pro duces estimates of parameters using information only indirectly related to its value. Demography has a long-standing tradition of developing formal demographic methods and using statistical approaches to indirectly estimate indicators, recently Ševcíková et al. (2016) [Sevcikova, H., Li, N., Kantorov´a, V., Gerland, P., and Raftery, A.E., 2016] and Pascariu et al. (2020) [Pascariu, M.D., Basellini, U., and Canudas-Romo, J.M.A..V., 2020] proposed two models aimed at deriving age-specific mortality from values of life expectancy at birth in line with the functional form of the well-known Lee-Carter model.

The first method uses Lee-Carter parameters in which for a given value life expectancy at birth, the method solves for future parameter key based on the previously estimated parameters α and β, using the life table model.

The Linear-Link model proposed by Pascariu et al. (2020) derives specific death rates, as a linear function of the logarithm of life expectancy at birth. The model specification involves a second step to compute the singular value decomposition (SVD) of the matrix of regression residuals to obtain parameters. The paper by Nigri et al 2022[7] contributes to the current literature on the deep learning and demographic methods for indirect estimations. The authors propose a Deep Neural Network-multi population framework to indirectly estimate mortality rates from the level of life expectancy at birth. The basic idea is to approximate a functional relationship between the summary demographic measure and mortality rate using a nonparametric approach in order to get non-linear behavior in a high dimensional space, that is the multi population dimension. In the following picture (Fig. 1), we can see a schematic view of the proposed model. Specifically, the deep neural network is a mathematical model inspired by the human brain based on a training algorithm the so-called backpropagation that involves an unconstrained optimization problem aiming to minimize the prediction error. The idea is to adjust the weights

of the network connections to minimize a function in high dimensional space the so-called loss function which is a measure of the difference between the actual and the observed output.

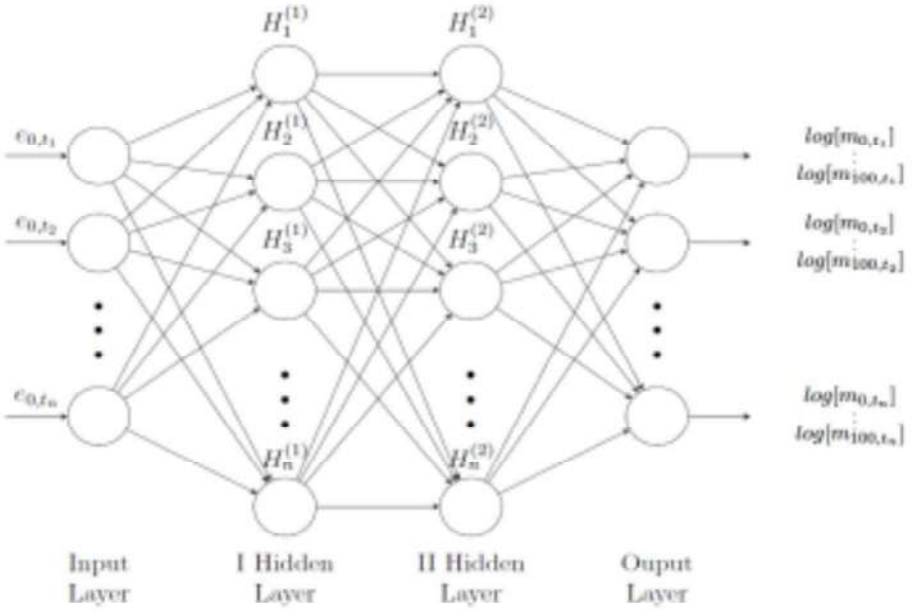

Fig. 1 Deep Neural Network indirect model. (Source: Nigri et al 2022)

This approach is an advance in mortality modeling, indeed the model could be used to indirectly estimate vital rates for regions or subpopulations with similar mortality profiles. This feature makes this model appealing for countries where present information is lacking but data are available from surrounding populations.

3.Conclusion

Forecasting future longevity is not an easy task since the accuracy depends on particular trends and dynamics. In this review, we summarise the contribution of machine and deep learning in longevity analysis and forecasting. We stress how population forecasting can benefit from the adoption of this framework also looking at the potential drawbacks. Finally, we provide a full description of the indirect estimation approach, underlining the potential of deep learning models in this applica-

tion.

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