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Front Pages

Athens Journal of Social Sciences

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The ***Athens Journal of Social Science (AJSS)*** is an Open Access quarterly double-blind peer reviewed journal and considers papers from all areas of social sciences, including papers on sociology, psychology, politics, media, and economics. Many of the papers in this journal have been presented at the various conferences sponsored the Social Sciences Division of **the Athens Institute for Education and Research** (ATINER). All papers are subject to ATINER's Publication Ethical Policy and Statement.

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Gregory T. Papanikos
President
ATINER

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22-25 May 2023, Athens, Greece

The Psychology Unit of ATINER organizes its **17th Annual International Conference on Psychology, 22-25 May 2023, Athens, Greece** sponsored by the Athens Journal of Social Sciences. The aim of the conference is to bring together scholars and students of psychology and other related disciplines. You may participate as stream leader, presenter of one paper, chair a session or observer. Please submit a proposal using the form available (https://www.atiner.gr/2023/FORM-PSY.doc).

Important Dates

- Abstract Submission: **11 April 2023**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **24 April 2023**

Academic Member Responsible for the Conference

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- Athens Sightseeing: Old and New-An Educational Urban Walk
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The Sociology Unit of ATINER is organizing its **17th Annual International Conference on Sociology, 1-4 May 2023, Athens, Greece** sponsored by the Athens Journal of Social Sciences. The aim of the conference is to bring together academics and researchers from all areas of Sociology, Social Work and other related fields. Theoretical and empirical research papers will be considered. You may participate as stream leader, presenter of one paper, chair a session or observer. Please submit a proposal using the form available (https://www.atiner.gr/2023/FORM-SOC.doc).

Important Dates

- Abstract Submission: : **21 March 2023**
- Acceptance of Abstract: 4 Weeks after Submission
- Submission of Paper: **3 April 2023**

Academic Member Responsible for the Conference

- **Dr. Domenico Maddaloni,** Head, Sociology Research Unit, ATINER & Associate Professor, University of Salerno, Italy.
- **Dr. Philip G. Cerny**, Director, Social Sciences Division, ATINER & Professor Emeritus, University of Manchester (UK) and Rutgers University (USA).
- **Dr. George S. Tsagaris,** Associate Professor, Cleveland State University, USA.
- **Dr. Sharon Claire Bolton**, Head, Management Research Unit, ATINER & Professor, The Management School, University of Stirling, Scotland.

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From Big Data to Machine Learning: An Empirical Application for Social Sciences

By Giovanni Di Franco[*] & Michele Santurro[±]

Machine learning (ML), and particularly algorithms based on artificial neural networks (ANNs), constitute a field of research lying at the intersection of different disciplines such as mathematics, statistics, computer science and neuroscience. This approach is characterized by the use of algorithms to extract knowledge from large and heterogeneous data sets. In this paper we will focus our attention on its possible applications in the social sciences and, in particular, on its potential in the data analysis procedures. In this regard, we will provide an example of application on sociological data to assess the impact of ML in the study of relationships between variables. Finally, we will compare the potential of ML with traditional data analysis models.

Keywords: *machine learning, artificial neural networks, supervised learning, linear models, nonlinear models*

Introduction

ML is an automatic learning process that takes place through the processing of usually very large data sets. The procedures of the past, defined with the "symbolic artificial intelligence" label, operated on algorithms constituted by a logical set of instructions by which a given output (usually called target) was encoded for all possible inputs. Contrarily, the new ML systems "learn" directly from data and estimate mathematical functions that discover representations of some input, or learn to link one or more inputs to one or more outputs in order to make predictions on new data (Jordan and Mitchell 2015).

In recent years in various human sciences: economics (Varian 2014, Blumenstock et al. 2015, Athey and Imbens 2017, Mullainathan and Spiess 2017), political science (Baldassarri and Goldberg 2014, Bonikowski and DiMaggio 2016), sociology (Barocas and Selbst 2016, Evans and Aceves 2016, Baldassarri and Abascal 2017), communication science (Hopkins and King 2010, Grimmer and Stewart 2013, Bail 2014), etc., ML has started to be applied both in academic research and in areas related to the management of services provided by the public administration (Athey 2017, Berk et al. 2021) or by private companies.

Overall, many different approaches and tools are included under the ML label (Kleinberg et al. 2015). There is no consensus about how much depth a model requires to qualify as deep. Discussions with deep learning (DL) experts have not yet yielded a conclusive response to this question. However, DL can be safely understood as the set of models that involve a greater amount of composition of

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either learned functions or learned concepts than traditional ML does (Schmidhuber 2015, Goodfellow et al. 2016).

DL is not a breakthrough in the scientific sense, rather it is a relevant breakthrough in efficient coding that makes a difference in several contexts. In practical applications, DL is able to achieve higher accuracy on more complex tasks as compared with traditional ANNs, although it requires more computational resources. Furthermore, DL needs less manual interference to craft the right features or the suitable transformations of data. It performs exceptionally precise operations on data that come from different modalities, such as images, texts and videos (Schmidhuber 2015, Alpaydin 2016, Goodfellow et al. 2016).

So, the choice between ML or DL algorithms depends on the problem to be analysed. If the problem is relatively simple, it is preferable to use ML based on ANNs with few layers of hidden units; if the problem is complex or requires the achievement of very specific and rigorous objectives, it is considered more useful to resort to DL.

Here we will only consider ANNs that use supervised ML algorithms. In the supervised ML the algorithm observes an output for each input. This output gives the algorithm a target to predict and acts as a "teacher". On the contrary, unsupervised ML algorithms only observe the input and their task is to autonomously compute a function without a predetermined target (Hastie et al. 2009, Molina and Garip 2019). This work has two aims: a) to present ANN algorithms-based ML in a simple and intuitive manner; b) to apply it to sociological data by comparing the results obtained with the results of traditional statistical techniques, to evaluate its strengths and weaknesses.

When the question of progress in sociology is raised, it is in fact on the extent of theoretical progress that debate centres. In this regard, we would then suggest, empirical research will benefit in so far as its practitioners show a readiness to engage with methodological issues. Through such an engagement, we will be called upon to confront problems that arise by the development of the phenomena studied rather than by the development of science itself and will in this way be subject to two constraints or disciplines that we would view as salutary. The first requirement will be to move, as it were, from *explananda* to *explanantia*, from effects to causes – which, following Popper, we would take to be the way of science – rather than to go in the reverse direction. Second, theoretical models will more often come to be deployed in "data-rich" rather than "data-poor" contexts. This means that they will face relatively stringent empirical tests of their validity. In this way, serious explanatory efforts may be more readily distinguished from what Goldthorpe (2004) called sociological dandyism: a preoccupation with models, whether statistical or theoretical, on account more of their intrinsic elegance, refinement and subtlety than of what can be shown to follow from their sociological use that is of major substantive relevance, whether from the standpoint of pure or applied interests.

Literature Review

Historically, ANNs have been proposed to emulate some functions of the human brain and nervous system, within an approach called connectionism (Di Franco 1998, van der Maas et al. 2021).

Connectionism attempts to simulate biological intelligence on a computer by taking the brain as a physical organ as a model. This is a first and fundamental distinction between connectionism on the one hand and cognitivism based on symbolic artificial intelligence on the other (Grum 2022).

In connectionism the brain is the metaphor by which the mind is studied. For years there has been a bitter dispute between the opposing advocates of the two different approaches, for which readers are referred to Parisi (1989), Cammarata (1990) and Buscema (1994).

In the opinion of the psychologist Parisi (1989) this set of ideas, theories and computational techniques, starting from the second half of the 1980s, represents a scientific revolution in the study of the mind and brain.

The first attempts to set up intelligent systems on computers that emulated brain activity had been elaborated in neurocybernetics in the 1930s. In the 1940s McCulloch and Pitts built the first intelligent systems based on the simulation of brain activity. In the 1970s, research on ANNs experienced a period of stagnation as the systems that were created showed low efficiency. Since the second half of the 1980s, thanks to the availability of parallel computing systems and new learning algorithms, interest in ANNs has grown rapidly (Lu 2019, Toosi et al. 2021). At the same time, the limited progress of symbolic artificial intelligence in the construction of general intelligent systems through the symbolic manipulation techniques typical of this approach (expert systems, logical languages, semantic networks, etc.) and the technological interest in computer architectures closer to what appears to be the way the nervous system works (parallel rather than sequential), have fed the dispute between the advocates of cognitivism (or symbolic approach) and connectionism (Dietrich et al. 2021). According to Cammarata (1990) the symbolic approach is more suitable for simulating conscious intelligence processes, such as the human expert reasoning or theorem proving; but it does not seem to reflect the nature of many unconscious intelligence processes such as those related to image or sound recognition. It is however acknowledged that the connectionist paradigm, and in particular ANNs, not only can tackle new classes of problems, but also confer advantages in terms of simplicity and efficiency in solving problems already tackled. At present, the applications of ANNs range from sophisticated military technologies for guiding missiles to airport security systems, to encryption mechanisms, to shape and image recognition, to quality control in industrial automation processes, to adaptive noise cancellation in telecommunications, and many more (Balas et al. 2020, Echeberria 2022, Elliott 2022).

We can say that connectionism is an approach that opposes cognitivism trying to overcome the classic Cartesian distinction between mind and brain. As a result of this distinction, disciplines that dealt with mental capacities and intelligence, such as psychology, had separated from the neurosciences that studied the brain

and central nervous system as organs of the human body (Boden 2006, Pecere 2020).

Connectionism is linked to a set of tools such as ANNs, nonlinear dynamic systems, complex dynamic systems, distributed parallel computing systems, associative memories, etc., which make use of computer simulation. The advantages offered by this approach are also very interesting for the social sciences. First of all, to simulate a phenomenon on a computer it is necessary to make explicit and formalize all the knowledge that is available. Furthermore, once one is able to simulate a certain phenomenon, it becomes possible to manipulate it in ways that would not be allowed with other research techniques, for ethical reasons and for other constraints dictated by the limited resources available in any scientific research (Fetzer 2004, Keuschnigg et al. 2018).

The use of the computer has made it possible to successfully study phenomena characterized by high dynamism, high parallelism and strong complexity, governed by rules of change that can be described by nonlinear equations, practically solvable only by using a computer (Strohmaier 2021).

Shortly, connectionism, by building artificial neural systems based exclusively on mathematical rules, attempts to build intelligent systems. The term ANN stands for a set of computational rules that simulate a behaviour typical of the brain structure of human beings. This is the fundamental difference of connectionism compared to the symbolic approach, whose intelligence model is based on the symbol manipulation through the use of rules that constitute the program to be executed. Unlike the computational models used in expert systems, in ANNs there is no program that specifies the operations to be executed, but the computational procedure is defined through the characteristics of the units and their connections (Davenport 2013).

A network learns and generalizes through the experience it acquires rather than through a program that determines its behaviour. The alternative that connectionism offers consists in the construction of artificial neural systems capable of learning, and subsequently generalizing, based on the experience that is administered to them. There are many types of ANNs, distinguished by architecture, learning rules, signal transfer functions, etc. There is no space here to present them all. We will focus in particular on those networks, called supervised, that have a goal to achieve in the training step, as opposed to those called unsupervised (also called autopoietic) which in the training step do not have a predetermined goal to achieve.

Methodology

ANNs consist of many computing units (called nodes or artificial neurons), usually organized into layers, with very simple operation and interconnected to each other. Through such networks, a signal (in the form of examples, called patterns) is passed, exciting or inhibiting the units. They, with appropriate mathematical rules, transfer the signal to other units until producing a quantitative output. In other words, each unit receives excitation (or inhibition) from the units

from which connections arrive and, in turn, transmits excitation (or inhibition) to the units towards which it has connections.

Here we will mainly deal with feedforward networks, which have units arranged on at least three layers and unidirectional connections between each unit of one layer and all the other units of the next layer.

The excitation or inhibition that reaches a certain unit through the other units to which it is connected depends on the weights that characterize the links. If a connection weight is high, this causes a lot of activation; a low weight causes little activation. A positive weight transmits excitation; a negative weight inhibition.

What characterizes ANNs is the parallel processing: each node of the network constitutes an autonomous computing unit that carries out computations in parallel with all the others. In serial systems, on the other hand, operations are carried out in sequence, one after the other.

An ANN is able to learn a task, solve a problem, when the parallel propagation of the network activation reaches an equilibrium (when the function reaches its minimum value), namely, when the activation arrives at the output units of the network.

As said, the fundamental aspect of ANNs is their ability to learn, but it is important to be clear on this point. In fact, what ANNs learn and what allows them to perform tasks or solve problems are the weights that are assigned to the links and that regulate how much excitation or inhibition is propagated in the network and how this propagation takes place.

In other words, in ANNs, learning, that is, the acquisition of knowledge and ability, consists in a process of connection weight adjustment. ANNs are therefore intrinsically quantitative, they learn numerical weights, transform them mathematically and provide a quantitative result.

In the training step of a network, the initial state (i.e., the initial connection weights) is randomly defined, usually in a very small range (e.g., between -0.1 and +0.1). Some patterns are presented to the network, each associated, in supervised networks, with a target. The network must produce, for each pattern, an output as similar as possible to the target. The difference between the network output and its target is the error. Through a mechanism that is called error backpropagation (EBP), the network adjusts the connection weights until the distance between output and target is minimized.

The nodes emulate the brain's nerve cells (neurons); the links between the nodes emulate the synaptic connections that exist between the axon of a neuron and the dendrites of another neuron. Indeed, research conducted so far with ANNs has allowed to reproduce only some, though important, characteristics of the human brain, which however are not reproducible in any other way.

In their mathematical characteristics, ANNs are part of a larger class of models formulated for the study of complex systems, with nonlinear dynamics, of the chaotic type, etc. These models have been introduced in the most innovative research sectors of different disciplines. Their general and abstract character makes them applicable to very different phenomena, and therefore of very broad potential interest, even for social phenomena.

The point is whether ANNs can be usefully applied in social research, besides as a complex of nonlinear data processing algorithms, also as a tool to simulate social phenomena (Capecchi 1996).

It is difficult to assimilate social phenomena to neurophysiological ones; for this reason, the analogies of the nodes of an ANN with neurons, of its connections with synapses, etc., that are possible in the study of the brain, are not possible in these other cases. However, it is a question of assessing whether the abstractness of the structures and processes postulated in ANNs, understood as models of complex nonlinear dynamic systems, does allow their application also to the study of social phenomena. In this case it is necessary to determine the interpretation to be given to concepts such as node, connection, excitation/inhibition, connection weight, learning rule, equilibrium and so on.

On the other hand, the use of ANNs allows the possibility of partially overcoming some limitations of the analyses conducted with traditional statistical techniques. For example, the use of ANNs does not require any hypothesis on the distributions of the system variables and their reciprocal associations. For this reason, it is possible to treat cardinal, ordinal and/or categorical variables (Di Franco 2017). By such approach the actual analysis of the system is left to the network, which alone creates its own criteria to reproduce its behaviour and consequently enables itself to formulate predictions on the system itself. In Fabbri and Orsini's (1993) judgement, this is both a strength and a weakness of ANNs: it is a strength because in this way the researcher is not conditioned by a priori hypotheses in the choice of the network units; the weakness consists in the fact that the network is not able to do other than reproduce the behaviour of the analysed system in a phenomenological manner, without contributing to the knowledge of the internal relationships between the single parts of the system. This problem, however, can be partially overcome as some devices, that allow us to interrogate the network about what it was able to reproduce, have been fine-tuned (Di Franco 1998).

If the simulation approach of ANNs to social phenomena proved to be possible and useful (Capecchi et al. 2010), this would allow significant progress in the social disciplines because it would also contribute to the foundation of a consistent basis of simulation concepts, models and techniques. If social phenomena can be thought of as complex dynamic systems[1] then it is necessary to accept the possibility of simulating them on a computer with more meaningful results than those obtainable with traditional data analysis tools.

We illustrate some key concepts of ANNs, and in particular of the feedforward networks with at least one hidden layer characterized by a learning technique called EBP. This type of network was proposed by a group of researchers at the University of California in San Diego (Rumelhart et al. 1986, 1987). Instead of resorting to mathematical formalizations we will use graphs.

As said, a characterizing aspect of ANNs is their ability to learn; learning consists in the search for the set of connection weights appropriate for each

[1]Where by complex dynamic system we mean a system made up of a large number of elements that interact on the basis of purely quantitative and non-symbolic rules, and that change over time, giving rise to complex collective dynamics.

specific task. The network starts from a state where weights are randomly assigned; therefore, the resulting output is, at time t-zero, equally random. Through its training, a progressive adjustment of the connection weights of the network takes place until obtaining the set of weights that produces the desired output in the best possible way. But, even after long training, ANNs do not usually produce very accurate results. This feature, which could be a limitation especially for tasks where high accuracy is required, becomes interesting in classification and recognition tasks. In fact, in a classification task, similar objects can be placed in the same class; consequently, even patterns affected by noise, biases or missing data can be classified. This shows that the networks have a high noise tolerance; this feature is important considering that in data analysis one often comes across low quality data.

The most interesting peculiarity of neural models, however, is their ability to generalize: if a pattern different from the ones used for learning is presented as input, the network is able, within certain limits, to classify it in the "correct" way (provided that a class for that pattern exists).

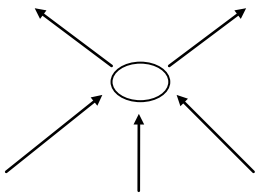
In social research, by exploiting the generalization ability of ANNs, cases with missing data could be processed without being forced to exclude them or replace them with the mean, the mode or the median of the relative distribution.

Schematically an ANN consists of:

- a large number of simple units (artificial neurons);
- a large number of links between the units (artificial synapses);
- a parallel and distributed control scheme;
- a learning algorithm.

A feedforward ANN is made up of a number of units connected by links which are, in this type of network, unidirectional. Excitation or inhibition is transmitted through the links from one unit to another. Each unit has a number of incoming links with other units and some outgoing links towards other units (see Figure 1).

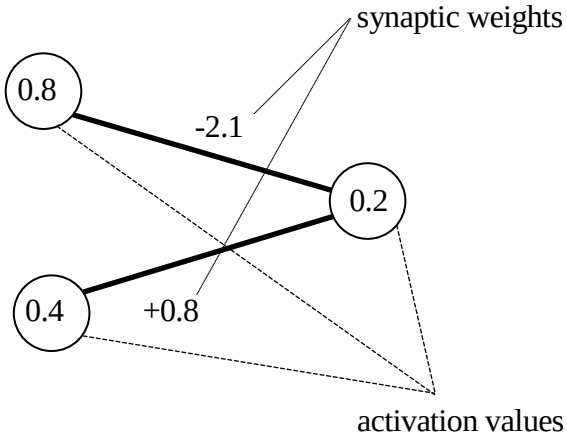
Figure 1. *Unit with Three Incoming and Two Outgoing Links*



So, there is a layer of input units that have no incoming links but only outgoing links. The activation state of these input units is determined from outside the network. And there is a second layer of output units that have only incoming links and no outgoing links. In practice, the activation state of the output units is read from the outside and tells us how the network reacted to the input from the outside.

The activation state of a unit is equal to a combination of all the excitations and inhibitions that reach that unit through its incoming links. Each amount of excitation or inhibition is weighted by a value, called connection weight, which characterizes each link. The weight can have a positive or negative sign, and this determines whether excitation (positive sign) or inhibition (negative sign) is transmitted (Figure 2).

Figure 2. *Connection Weights*



The amount of excitation or inhibition that comes through a certain link is actually determined by two factors. The first one is the connection weight (a link with weight +0.8 passes more activation than a link with weight +0.2). The second one is the activation state of the unit from which the link starts, which can be more or less high. The two factors are multiplied among themselves, and the result is the amount of excitation or inhibition that arrives at a certain unit through a certain link. In feedforward ANNs the activation state of a certain unit varies from a minimum (0) to a maximum (1). At a given moment, a number of excitations and inhibitions arrive at a certain unit.

The first thing the unit has to do is to compute all these excitations and inhibitions in a single value, which is called the net input for that unit. The net input is normally the algebraic sum of all the excitations and all the inhibitions that arrive at each node of the network.

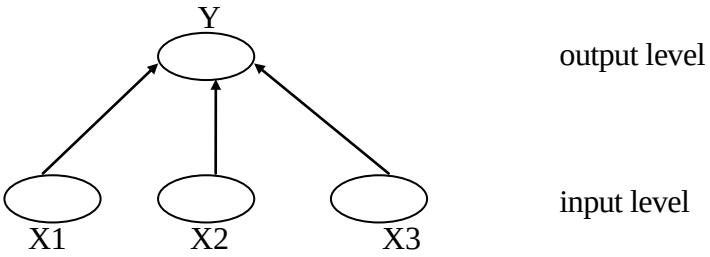
The net input is then transformed through a mathematical function in the activation state of the unit. The algorithm that transforms the net input into the activation state can be the logistic function, or sigmoid, with continuous values and saturation. Other algorithms (called transfer functions) can also be used, such as the identity or linear function without saturation, the linear function with saturation, the step function with binary or bipolar values, and others.

In the sigmoid the activation state varies between a minimum and a maximum (0 and 1). When the net input is 0, the activation state is 0.5. The algorithm is sensitive to small variations in the net input, which produce strong upward or downward deviations of the activation state in the central part of the range of variation.

Once the activation state has been computed through the algorithm of the sigmoid function, it is determined how each unit influences the other units with which it is linked. In feedforward networks the units are grouped in layers and the units of the same layer are not linked together; they can only be linked with units in other layers.

When the network has only one input and one output layer, it is called Perceptron. Each input unit is linked with each of the output units through a link whose intensity is measured by the weight; there are no horizontal links between output units; the propagation of signals is unidirectional from the input to the output (Figure 3).

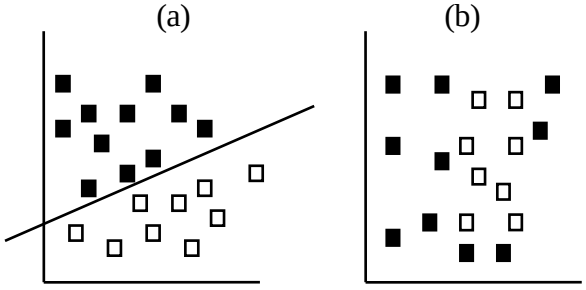
Figure 3. *The Perceptron (Two-Layer Feedforward Network Input -> Output)*



Each unit of a Perceptron has a set of inputs, each having a weight that represents the strength of the neuron's synaptic link.

Figure 4 shows the case of a Perceptron with two input and one output units. The two input units encode the coordinates of patterns with respect to the two-dimensional plane; the output unit encodes the type of pattern in two classes, A and B. The task of the Perceptron is to classify the input patterns into two distinct classes.

Figure 4. *A Perceptron with Two Input and One Output Units is Able to Identify the Two Classes in Situation (a) = Linearly Separable Patterns; but it Fails in Situation (b) = Nonlinearly Separable Patterns*



Two sets of patterns are presented. In the first set, the patterns of the two classes, distributed in a plane, can be separated by a line (the Perceptron is able to discriminate the two classes). In the second set, conversely, the patterns of the two classes cannot be separated by a line (consequently the Perceptron is not able to discriminate them correctly).

The global input of the neuron is an n-dimensional vector with associated weights. To obtain the output of the Perceptron, each element of the input vector is multiplied by its weight, and all the values thus obtained are added together. The unit gives 1 as output if the sum is greater than a certain threshold value, otherwise it gives 0. The major limitation of the Perceptron is its inability to perform classification tasks for nonlinearly separable problems (Figure 4).

In summary, a Perceptron does nothing but learn a series of direct associations between pairs of activation patterns. The network associates the output pattern with the input pattern by progressively adjusting the weights of the direct links between the input and the output units so as to store not a single association between an input and an output pattern, but as many associations as there are patterns to learn. In so doing, the Perceptron does not construct any internal representation of the different patterns it has learned, and therefore cannot highlight the similarities and differences between them. Precisely because the Perceptron cannot construct an autonomous internal representation, it is unable to make inferences on new characteristics of patterns, viz. on characteristics that it has not directly experienced.

When linear separation is impossible, the Perceptron is unable to solve even seemingly simple problems. This limitation can be overcome by adding to the network an additional layer of units placed between the input and output ones. This intermediate layer is called hidden precisely because it is inside the network and has no links with outside the system, unlike the input layer which receives information from the outside and the output layer which transmits information to the outside (Figure 5).

Figure 5. *Feedforward Network with One Input, One Hidden and One Output Layer*

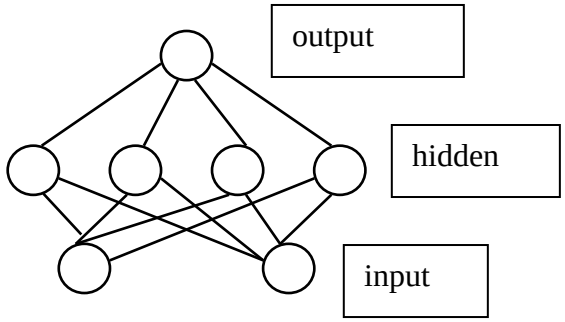
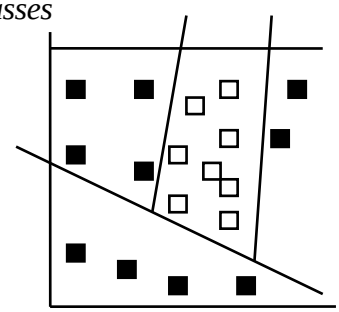


Figure 6 presents a case in which the input patterns of the two classes, distributed in a plane, cannot be linearly separated. However, they can be separated by drawing a number of lines (in this example, four). A possible solution to the problem consists in defining a multilayer neural architecture, which contains a sufficient number of hidden neurons to solve the task.

According to Kolmogorov's theorem (Cammarata 1990) a multilayer network provided with a sufficient number of hidden units is able to learn any function.

Figure 6. *Example of Input Patterns Divided into Two Nonlinearly Separable Classes*



A multilayer ANN is therefore able to recognize whether or not a given pattern belongs to class A by separating it from class B and to recognize the classes starting from a structure of links progressively adjustable in the training phase. Here the error is minimized by adjusting the connection weights by various criteria that guarantee, even in the case of linear nonseparability, the convergence of the iterative process towards the optimal solution. The way in which a network responds to an external activation pattern depends entirely on the connection weights between the units. What we want from a network is that it produces a certain activation pattern on the output units. But the weight of a specific link enters in determining the activation value of a given output unit by combining with the weights of the other links and with the activation state of the other hidden units. The activation states of the hidden units, in turn, depend on a large number of links proceeding from behind, and so on. So, it is almost impossible to determine the weight of each link, all the more if the fact that an output unit must be activated or not on a particular occasion depends on the overall activation pattern that is expected from all the output units on that occasion.

The common feature of many ANNs is that they initially have randomly chosen connection weights; there are criteria by which networks automatically adjust these weights until assigning them those values that allow to respond to a certain external stimulation as desired. At the beginning the network will give random responses to external stimuli. However, exposed to repeated experiences, the network progressively adjusts its weights so that they will produce the desired performance. Different learning techniques have been defined for ANNs. What we will consider is a supervised learning from the outside, that is, a learning in which there is a specific external target associated with each input pattern that each time imposes on the network the desired performance. The network consequently adjusts the connection weights until, after a number of times, it is able to reproduce approximately the desired output for each input.

In this paper we present the supervised learning criterion called EBP. EBP allows the network to compare, for each output unit, the obtained value with the desired value and to use the difference to adjust the connection weights in the right direction, so that after a number of learning cycles the connection weights determine the desired activation values on the output units. The EBP algorithm requires a multilayer network architecture: one input layer, one output layer and one or more hidden layers. Each unit of a layer is linked to the units of the preceding layers;

there are no horizontal links between units of the same layer and the signal is propagated unidirectionally from the input to the output through the hierarchy of the hidden layers (feedforward networks). The procedure envisages two steps: in the first one, the input patterns are transmitted to the output, the activation value of the outputs is evaluated and compared with the target values; in the second one, the computed error is backpropagated from the output to the hidden layers and from these to the input layer.

The errors of the output units allow to estimate the errors of the hidden units and update the weights of their links. Thus, the errors of the input units are estimated and the weights of their links are updated. The algorithm is run for all the values of the training set until obtaining the correct values for the weights of all the links. After a first presentation of the patterns, for which the weights are updated, it is possible to proceed to other cycles of presentation until the mean squared error over the entire training set does not fall below a set threshold, or when new iterations do not correspond to a decrease in the error and therefore the network has reached a stable state, i.e. a minimum of the error function. For a number of times (which can vary from a few hundred to several thousand: each cycle carried out over the entire series is called epoch) it elaborates this series of training patterns.

A mathematical description of the EBP algorithm is in Cammarata (1990). The EBP algorithm can be applied to a network with any number of layers; the number of units can vary from layer to layer. The number of input units and output units is determined by the problem to be solved, whereas there are no criteria to determine the optimal number of hidden layers and that of the units they contain. Generally no more than one or two hidden layers are introduced, and the number of their units is usually limited. The advantage of the EBP algorithm compared to the previous weight adjustment techniques is its ability to compute an error not only for the output unit layer – for which it is very easy since they receive the target from the outside – but also for the hidden unit layer. In this way, through the learning, not only the connection weights between hidden units and output units, but also those between input units and hidden units are adjusted. In an ANN of the kind described above, the association between input and output is mediated by the hidden units and the links that connect, each with its weight, the input units with the hidden ones and these with the output units. We can say that an ANN develops an internal representation of the input, and its response to the input depends on that. This aspect of the networks recalls the concept of latent dimension typical of many traditional statistical techniques such as factor analysis (Di Franco and Marradi 2013). The internal representation of an input is obviously not symbolic; it is nothing more than the set of activation values that result on hidden units when the network receives an input. It is these activation values that determine the activation values of the output units, based on the connection weights between hidden and output units. And it is on the basis of this internal representation produced during the training phase that the network recognizes similarities and differences and is able to infer and generalize.

The EBP algorithm can be speeded up by adding a term to the weight adjustment formula that takes into account the update in the previous epoch: this

additional term is controlled by a parameter ranging from zero to one called momentum. One drawback is the possibility that the algorithm does not reach the absolute minimum of the error function. In fact, the higher the value of the learning rate, the faster the network will learn. However, this entails the possibility of oscillations of the error function around a minimum value. On the other hand, a too small value of the learning rate can lead to too long training times, so the value of the parameter is often determined by trial and error. EBP guarantees that the convergence towards the global minimum occurs for a wide variety of tasks, in particular by avoiding the network falling into a local minimum, i.e., in a weight setting from which it cannot move but which does not correspond to the global minimum error that is trying to reach.

Learning ends when the value of the global error is low enough, and in any event it shows no signs of any further reduction by increasing the number of epochs. At this point the network has learned, namely, it is able to provide the approximately correct output for each input. Most importantly, the network demonstrates that it has an ability to go beyond what it has been explicitly taught. This ability manifests itself in various ways. If the network has learned to give a certain response to a pattern, it will give this response to a damaged, partial, obscured by noise version of this pattern too. If a pattern has been classified as belonging to a certain class, similar patterns never seen before will also be classified as belonging to that class. If the response that has been learned from the network for a certain pattern contains some unspecified parts, the network will be able to correctly infer the missing parts.

There are other factors, besides EBP, that can come into play in learning. For example, the learning rate, viz. the size of connection weight adjustment given a certain error, can be varied. As a rule, it is preferred to make small adjustments to have a gradual and smooth learning. Another factor that can be varied is the momentum, that is, if and how much the adjustment that I introduce now must be influenced by the adjustments introduced on the same weight previously. Then there is the bias, namely, an activation value that each unit tends to take regardless of the excitations and inhibitions that come from the other units. The bias is different from unit to unit and consists of excitation or inhibition that reaches the unit, through a link with a learnable weight, from a hypothetical special unit that always has activation equal to one. These additional mechanisms are indicative of the flexibility of multilayer networks and EBP learning.

All this variability of factors, which first of all derives from the fact that at the outset each network receives its own specific random assignment of weights, entails that the whole course of learning and its final result will vary from network to network. Thus, if the same experiment is repeated on different networks, that is, having an initial assignment of different weights and/or different values of the parameters described above, it will not be possible to have identical but only similar results. Other differences may arise from the training time and from the way in which the network examines the different patterns. Even by varying the training time and the order of presentation of the patterns, different results are obtained.

The training time poses a further problem: if a network undergoes long learning there is the risk of overtraining thus compromising its ability to generalize. In fact, if a network learns the patterns used during the training too well, it will be less able to classify new patterns, different from those used in the training set. To this goal, the testing set is used. In this step the network has already learned the weights used in the training set and now responds to new patterns that are submitted to it without each being associated with a target. It is therefore more important that the network is able to learn well the prototypes underlying the patterns, rather than being able to respond correctly to each input in the training set. The conclusion to be drawn is that the concept of prototype is central to ANNs as a basis for classification. This shifts the emphasis from the classes defined in terms of characteristics (as is normally done) to the classes defined in terms of prototype. The ability to extrapolate, to respond sensibly to the new things, is one of the most important features of ANNs, and one of their main advantages compared to traditional analysis systems. Each network responds sensibly to patterns that are new compared to those with which it was trained. However, the response is generally less good than that given for the training patterns: the network is more uncertain; if it has to classify the new pattern in class A, it gives an activation value of 0.8 or 0.7, instead of 0.9. Conversely, what happens with the prototypes is that, if the prototype pattern is presented to the network, and the latter has never seen it before, its response can be even better than that given to the patterns it has trained many times.

In short, the learning algorithm can be interpreted as the descent down any function from its generic point, whose coordinates are the initial randomly assigned weights and the initial error at its minimum point. The learning rate can be interpreted as the step of such descent.

Of course, local minima are possible. What the network looks for is a minimum value of the global error, i.e., the connection weight setting that gives the minimum error for all input patterns. Instead, a local minimum is a weight setting that keeps the error still quite high without the network being able to escape from this setting, as that would lead to an initial increase in the error and then a descent towards a lower error. In nonlinear functions there is not a single point of absolute minimum, but it is possible to find several local minima that would represent suboptimal solutions for the network.

Results and Discussion

We present an example of application[2] that consists of a comparison between a multiple linear regression model and an ANN Multilayer Perceptron.

[2]The data used in the example are taken from a matrix containing some information on the electoral polls published by the mass media in Italy from 1 January 2017 to 29 February 2020. The information relating to these polls was taken from the website www.sondaggipoliticoelettorali.it of the Presidency of the Council of Ministers, Department for Information and Publishing. For further information on the data matrix, see Di Franco (2018).

We first present the results of multiple linear regression. The dependent variable is the percentage of voters who declared their intention to abstain or who declared their indecision regarding the election choice (label 'no-vot'). The independent variables are the following four: the number of days for carrying out the poll (label 'days'); the sample size (label 'n-sample'); the completeness index of the poll information (label 'ind-1'); the ratio between the interview attempts and the interviews carried out ('ind-2').

Table 1. *Multiple Regression Model Summary*

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.563	0.317	0.311	8.4224

Predictors: (Constant), days, n-sample, ind-1, ind-2. Dependent Variable: no-vot.

Table 1 presents the fitting results of the model. Considering the adjusted R square, we find that the four independent variables reproduce just under a third (31.1%) of the variance of the dependent variable. Table 2 shows the regression coefficients and Table 3 the residual statistics.

Table 2. *Multiple Regression Coefficients*

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	21.168	2.609		8.114	0.000
days	-0.663	0.297	-0.105	-2.229	0.026
n-sample	0.007	0.001	0.284	4.986	0.000
ind-1	25.129	2.872	0.348	8.749	0.000
ind-2	-0.705	0.156	-0.226	-4.521	0.000

Dependent Variable: no-vot.

The analysis of the beta weights confirms that the contribution of the four independent variables is significant in explaining the variance of the dependent one.

The analysis of the residual statistics also shows a good fit of the model to the data (Table 3).

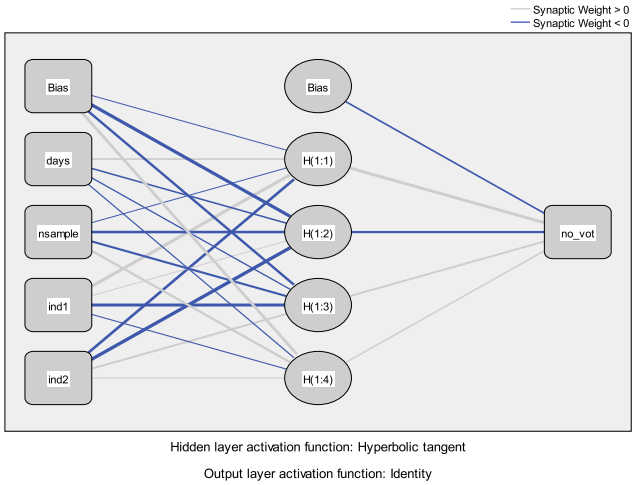
Table 3. *Multiple Regression Residual Statistics*

Model	Min.	Max.	Mean	Std. Deviation	N
Predicted Value	30.684	56.227	41.261	5.711	506
Residual	-26.179	35.316	0.000	8.389	506
Std. Predicted Value	-1.852	2.621	0.000	1.000	506
Std. Residual	-3.108	4.193	0.000	0.996	506

Dependent Variable: no-vot.

Let's now evaluate the results obtained with the ANN[3] comparing them with those obtained with the multiple linear regression (Figure 7).

Figure 7. *ANN Architecture*



The cases submitted to the network are obviously the same 506 used in the regression. In this case, however, 70% of cases (359) were used in the training set and the remaining 30% (147) in the testing set. Table 4 presents the model summary. In the training step the relative error was equal to 0.225. In the testing step it grows slightly reaching the value of 0.327. Recall that in the testing step the network predicts the value of the dependent variable using the weights that it computed on the cases observed during the training. So basically, we assess the ability of the network to generalize what it has learned in the training.

Table 4. *ANN Model Summary*

Training	Sum of Squares Error	40.218
	Relative Error	0.225
	Stopping Rule Used	1 consecutive step(s) with no decrease in error
	Training Time	0:00:00.194
Testing	Sum of Squares Error	19.528
	Relative Error	0.327

We do not report the parameter estimates (i.e., the weights calculated for each node of the network) as their examination does not clarify the impact of each independent variable in the estimate of the dependent one.

The comparison between the results of the multiple regression and the ANN leaves no doubt about the better predictive performance of the network (Table 5). The correlation between the values predicted by the multiple regression and the actual values of the dependent variable is equal to 0.563; the correlation between

[3]For the ANN applications we used the Multilayer Perceptron procedure available in the SPSS program for Windows.

the values predicted by the ANN and the actual values of the dependent variable is thirty points higher, rising to 0.866.

Table 5. *Correlations between Predicted Values of Regression and ANN and Values of Dependent Variable*

No-vot	1		
Unstandardized Predicted Value: regression	0.563**	1	
Predicted Value for no_vot: ann	0.866**	0.391**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Evidently in the relationship between the independent variables and the dependent one, the network managed to capture nonlinear trends which allow for a better estimate of the values.

Conclusions

At the end of this *excursus* on feedforward ANNs we can summarize the most important aspects by highlighting their strengths and weaknesses.

Do ANNs replace the other techniques of traditional sociology? No, they should be used essentially when we do not know how to solve a problem in another way or when we know how to solve it otherwise, but with less convenience or poorer results (Evans and Foster 2019). The logic with which these networks learn is the connectionist one and there are four great differences from the models of relations among variables and classification typical of quantitative methods: a) ANNs can define strategies of connection and predictions with variables that are not limited to the four levels indicated by Torgerson (1958) (nominal, ordinal, interval scales or relations) but also extend to fuzzy variables or variables represented by a pixel in an image (therefore different types of variables can be considered in the same case-by-variable matrix); b) ANNs use data to estimate the performance of alternative models (functions, regularization parameters) to choose the best one with respect to all of the variables (this process requires solving an optimization problem, discovering either linear or nonlinear associations among the variables themselves); c) such networks are bottom-up systems producing a data model as an end point of an iterative and a feedback loop process (this means that the weight connecting unit i to unit j has not the same value as the weight connecting unit j to unit i, as happens for instance in a correlation matrix); d) the connections between variables, being direct, have a clear conceptual meaning, indicating a relationship of faded excitement, inhibition, or indifference between every pair of variables or records (this situation is quite different from the clear separation of traditional quantitative methods between models of classification and models of relations between variables) (Kent 2009).

As the phenomenon of generalization demonstrates, ANNs are capable of learning, namely, they allow solving problems by associating the sought solution with data. Indeed, network learning techniques are applications of known statistical methods (stochastic approximation) to a new class of nonlinear regression models.

In this sense the determination of the network weights can be interpreted as a nonlinear regression applied to an ANN function. The advantage is to have an extremely flexible function, avoiding the subjective components of the specification error, as the parameters implicitly determine which is the latent function that a network approximates (White 1989).

If the analytical form of the function underlying the problem under study is known, or can be assimilated to a known form, the problem of parameter estimation refers to the case of nonlinear least squares and the use of ANNs is not justified; it becomes so when one is not able to formulate reliable conjectures on such form. In this case, the use of networks is easier and more productive than other complex procedures with restrictive assumptions. The use of ANNs is therefore effective as a criterion for identifying hidden nonlinear relationships (Buskirk and Kirchner 2021).

The ability to learn is related to that to forecast. ANNs offer good performances both in univariate forecasting, that is, when one wants to predict the behaviour of a variable of a system that evolves over time on the basis of its past trend, and in multivariate analysis, when trying to predict the trend of a variable observing the past behaviour of several variables of the evolving system. Many studies have highlighted how ANNs allow good approximations and extrapolations to be made. Since a forecast problem can be referred to an approximation and extrapolation problem, it is possible to use networks to approximate the regularities present in the variations over time of the variable to be predicted. ANNs flexibly adapt to complex situations that change over time. They are also suitable for processing data that are incomplete or affected by noise or biases. By virtue of this ability to adapt to data, ANNs are very robust, viz. they have a high resistance to failures and malfunctions. Another important feature is the computational speed that derives from their parallelism and the very rapid input-output association, since the computations to be performed are weighted sums and threshold selections; therefore, they constitute a valid alternative to traditional techniques for performing complex computations (Aggarwal 2018).

The critical points of ANNs are, first of all, the long and scarcely incremental learning; in addition to requiring a large number of epochs before significantly reducing the error, learning must be repeated when the situation represented by the patterns undergoes substantial changes, unless such learning is continuous or unsupervised (Bartlett et al. 2021).

Obviously also for ANNs, as in any other case, it is necessary to have a data set that is rich and representative (of the problem under study) so that the training set and the testing set are effectively controllable (Molnar et al. 2020).

Other problems may arise from the low accuracy and the uncertain reliability of the results provided by ANNs: the past performances of a network do not guarantee those in the future. There is a risk that the generalization is not complete and that therefore most of the inputs do not recall correct outputs. Furthermore, there are no strict criteria to design the most suitable network for a given problem, but it is necessary to proceed by trial and error with, as mentioned, numerous degrees of freedom in the choice of each parameter. Moreover, each network has its own specificity. If the same experiment is repeated on another network, there

will not be the same results, although in most cases they tend to converge. This is another interesting feature of ANNs; they are able to provide similar results in terms of performance with a variety of weight settings. Clearly what is important is not the value of a certain weight, but the overall set of all connection weights (Landi et al. 2010).

Finally, the criticism most frequently raised against the usefulness of ANNs is that, even when they succeed in the assigned task, they do not allow to explain their operation on a cognitive level (in the case of the sociological research we could say on the level of the analysis of relationships between variables). We expect from a model not only that it will be able to predict or reproduce its referent, but also that it will be transparent, that is, it will make us understand how it works, what mechanisms, processes and principles are behind it. ANNs, according to this criticism, risk obtaining the first goal, but not the second one. A network that was able to learn a certain task and is also capable of extending its performance to new situations, showing in this way that it has incorporated the mechanisms and principles underlying that task, may nevertheless be not very transparent as to these mechanisms and principles, not making them emerge clearly and thus not allowing their full explanation regarding the phenomenon in question. Their strictly quantitative nature, the interweaving of the links, the connection weights, the effects of a local phenomenon of activation on the rest of the network, are all factors that make the behaviour of networks dark as tools for explaining the relationships between variables (Guidotti et al. 2019, Longo et al. 2020).

How the role of mathematical thinking in the social sciences will evolve is difficult to predict, because neither mathematics nor social sciences are unchangeably fixed. Nonetheless, we recognize three main possibilities of application of ANNs. The first possibility consists in using ANNs together with statistical models to understand how different methods can contribute to the explanation of data concerning a single research. The second possibility consists in widening applications of ANNs to areas that are significant from a sociological point of view and that have not been analysed with ANNs. A third possibility consists in getting a better understanding on the way in which ANNs can contribute to the theory/explanation of sociological research. This part is very interesting because ANNs illustrate the concepts of explanation, prediction, etc. from a different perspective. As shown in the literature (Plebe and Grasso 2019), important considerations concerning applications of ANNs or their structure still remain to be explored. Answering these questions can help us push theory or generate new hypotheses. The results from ML provide not an end goal, but the starting point for further analysis and conceptualization. As such, ML tools complement, not replace, existing methods in sociology.

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Finnish Remote Leadership in Home Care during the Pandemic

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This study was conducted as part of the national The More Remotely – work in social and health care is changing project (2019-2022). The purpose of this qualitative study was to clarify how functional remote leadership works from the perspective of superiors and to gain new information on the functionality and development needs of remote leadership. The data consisted of the material collected via a group-based themed interview, memoranda written by members of the training groups and assignments submitted by the participants. The data were analyzed through material-driven content analysis. The results show that remote leadership is based on the same principles as good leadership in general: communality, trust, interaction and clear ground rules. When these sections are in order, remote leadership works. Positive sides of remote leadership that emerged include faster, real-time sharing of information and the decoupling of work from a specific place. Work was seen as more efficient and productive. The greatest challenges to remote leadership are problems related to technology, such as failing programs and devices, constant changes and a lack of guidance. Remote leadership was seen as increasing anonymity and distance within the workplace. Superiors felt that physical meetings were needed to support remote leadership. Central development proposals included familiarizing people with the culture of remote leadership and increasing knowledge and use of various programs and devices. There is also a need to clarify the ground rules, scheduling and practices of remote conferences and to constantly gather feedback on the functionality of remote leadership. Teaching about remote leadership as part of basic studies in the social and health care field would prepare future professionals to being led remotely.

Keywords: *remote leadership, home care, technology, remote meetings, Finland*

Introduction

Remote leadership has been studied internationally for some decades in the context of global organizations, e-projects and virtual teams, but the COVID-19 pandemic turned it into a major global leadership challenge in a matter of months, and Finland was no exception. There is likely no return to the so called previous normal, which is why organizations should use all the digital tools they acquired during the pandemic as part of their leadership going forward.

Remote leadership means using technological tools to conduct leadership-related communication and interaction, as physical, face-to-face meetings are rare. The purest cases of remote leadership involve situations where the superior does not work at the same location as their subordinates and does not meet them daily

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or even weekly. The portion of their leadership work superiors perform remotely can vary widely, e.g., 20%-80%. Full 100% remote leadership likely only happens at large national or global organizations. Typical remote leadership at Finnish health and social care organizations involves both remote and in-person interaction.

Superiors require training and support when switching to remote leadership, as a few hours' worth of teaching is not enough to make someone a remote leader. Too often superiors are expected to master new technologies and applications simply through reading written instructions with no practical exercises (Turesky et al. 2020, Sharpp et al. 2019). Remote leadership also requires rethinking communication and informing, as close contacts and unofficial hallway talks are either few or non-existent.

Remote leadership requires technological skills, as most meetings and discussions occur virtually. However, the principles of good leadership apply to remote leadership as well: building and maintaining relationships, good communication and notifying and enabling the personnel's productivity (Gerke 2006). The literature review section of this article discusses the qualities of a good remote leader and how the aforementioned principles apply to remote leadership. The empiric research portion analyzes the Finnish social and health care system and their application of remote leadership during the pandemic.

The Ministry of Social Affairs and Health is responsible for general planning, directing, and preparing legislation related to home care and home services. The purpose of home care and home services is to offer support services to people, often elderly or disabled, living at home. Aside from supervisors, most of the employees at home care are home care assistants, home helpers or practical nurses. The supervisor of a home care manager is a nurse manager of primary health care. Remote leadership has been common in Finnish home care for decades, as nurses work at their clients' homes and do not meet their supervisors daily or even weekly. Home care is organized as teamwork, and teams often have break rooms located in a separate location from their supervisor's place of work.

Literature Review

Communication Skills

The most successful remote leaders are energetic people who have a need to achieve results, a desire for responsibility and a willingness to constantly learn new things. They are also flexible, analytical and have good technical skills. Implementing new technological solutions requires remote leaders who are capable of testing programs and developing their use (Liu et al. 2018), which requires a logical mind and an ability to plan, organize and delegate. To communicate effectively the remote leader must give constant feedback and clear assignments and instructions. They build reliability within the workplace and are themselves reliable (Maduka et al. 2017).

Determination, self-confidence and linguistic versatility are also qualities that often emerge in studies of successful remote leaders. They are adaptive, inspiring,

clear communicators and capable of using multiple communications media fluently. Then can lessen the stress and fatigue of their subordinates through participative leadership instead of authoritarian management (Hahm 2017). Inspiring leaders seek to cooperate with their subordinates and care about their welfare and job satisfaction (Furumo 2018).

Flavian et al. (2019) discuss an ideal remote leader, who is magnetic, good-looking, elegant, stylish and even sexy. They are also empathetic and willing to encourage their team to express their feelings. A benevolent supervisor is capable of relating to their subordinates in a friendly, respectful and dignified way in decision-making situations. A just supervisor treats their subordinates in a consistent fashion, considering their opinions and views, explaining the decision-making process and by holding enough feedback discussions. Alluring and interesting leaders inspire the most trust, which is why leaders should invest in visual signals such as high-quality profile pictures on electronic media (Flavian et al. 2019). Remote leaders should thus appear presentable in video conferences and include a good picture of themselves with all messages. It is also advisable to occasionally change profile pictures rather than using the same years-old picture.

The abovementioned qualities of good remote leaders would be useful for anyone in a leadership role, but their importance is heightened in remote leadership, as the distance and virtual nature of communication place different demands from in-person leadership. According to the literature, the ideal remote leader is a highly methodical, logical, goal-oriented and extroverted individual, who communicates in a clear and versatile way and is benevolent and attractive in a variety of ways.

Building Trust

The literature emphasizes building trust as a basis for remote leadership. It can be seen as a workplace skill and resource that allows the supervisor to influence their subordinates. Trust is a critical factor in binding a team together and of utmost importance to efficient teamwork (Cowan 2014, Savolainen 2016). Supervisors can affect the building of trust by showing their reliability through their skill, honesty, benevolence and constancy (Savolainen and Häkkinen 2011). Building a relationship with a subordinate remotely is more challenging, as meetings tend to be brief and more prone to misunderstandings. Remote leaders should communicate frequently with their subordinates to help build a relationship. As often as possible, they should also hold in-person meetings with all team members where they can share experiences and build a common understanding (Flavian et al. 2019).

Building and managing relationships through remote leadership requires social skills, such as open communication and listening, and technical skills, such as the use of information and communication technology. Reliability and an ability to show openness and honesty are also important. Aside from technical skills, remote leaders require communication and notifying skills, compassion, empathy and an understanding of human behavior (Hebert 2020).

A relationship mediated through technology requires time for building trust. Intermittent and brief contacts are not enough, as they are not necessarily enough to form a complete picture of the subordinate's situation. Without such a picture,

the supervisor's assistance often remains superficial. The supervisor should thus reserve enough time to familiarize themself with each subordinate's work and work situations, which would also encourage the subordinate to communicate openly. It is difficult to transmit, receive and process emotions in digital environments. Occasional in-person meetings strengthen the supervisor-subordinate relationship more efficiently than online interactions. Supervisors also need support, understanding of remote leadership and sufficient equipment and space from their own organization (Savolainen 2016).

Building trust thus requires official meetings in which participants talk, build interpersonal relationships, share things and opinions and learn to know one another better and on a deeper level. Aside from official meetings, unofficial meetings, in which the parties discuss personal matters and their leisure time, are also necessary (Savolainen 2016). Video meetings can be turned into unofficial meetings by having people stay online to talk after the official portion. Supervisors can also encourage their subordinates to have unofficial virtual meetings (e.g., virtual happy hours). Meetings such as these can enhance team members' sense of belonging to the team and the organization (Reyes et al. 2020, Kelley and Kelloway 2012).

To build trust, supervisors should be seen as just by all their subordinates. They should also apply the same rules to all, act consistently, consider the opinions of their subordinates, make decision-making processes transparent and maintain a good culture of feedback (Flavian et al. 2019). Maintaining contact with each team member is also important to meet their personal needs and to increase their psychological sense of safety (Reyes et al. 2020).

The sense of trust experienced by members of a work team has a significant connection to the team's job satisfaction and sense of community. Trust also increases the commitment to the team and work and improves information sharing within the team and learning as a team. Trust within a team has been found to increase team members' ability to take risks, group coordination, ability to work together and a positive view of the team's ability to perform (Newman et al. 2020, Breuer et al. 2016).

The remote leader's ability to express feelings, empathy, understanding and benevolence to subordinates is crucial to building and maintaining a confident relationship. Even though in-person meetings are fewer in remote leadership, the remote leader can still use digital media empathetically by showing interest in the subordinate's work and potential problems (Flavian et al. 2019).

Remote workers can feel isolated in their own homes. Experiences of distance and psychological isolation can nonetheless be eased through remote techniques that offer quality interactions comparable to in-person meetings (Wang et al. 2020). Subordinates who work remotely and physically separate from others are in particular need of support and attention from their supervisor. Sufficient support given by the supervisor increases the subordinate's sense of safety, professional capability and personal welfare and improves their work retention (Onnis 2015). The supervisor controls and assigns resources and interacts with their subordinates regularly. They also encourage team members to support each other and solve conflicts. The remote leader also consciously helps create an identity and culture

for the team (Stratone and Vătămănescu 2019), which will take shape in time as the team creates its own ground rules and procedures.

Platform and Interaction

Remote leaders are expected to communicate flexibly and to set clear goals to create a productive and positive work environment. Constant messaging and cooperation between leaders and staff is important. Remote leaders are also expected to pre-emptively communicate with different groups to avert potential problems and to encourage the use of alternative methods (Hebert 2020).

Remote leaders are responsible for setting the rules of communication and the use of communication media. As a flood of information may overwhelm personnel, it is the duty of supervisors to filter the flood of information and forward only relevant knowledge. The timely use of e-tools to give feedback and thanks and to solve problems, including performance issues, is important. Distance should never be a hindrance to problem-solving, as e-communication media can be used swiftly and effectively (Cowan 2014). Almost a decade ago, Purvanova (2014) wrote that in the future people will come to see virtual messaging and interaction as equal to physical, face-to-face communication. However, virtual communication often involves technical challenges and failures, which is frustrating (Purvanova 2014). Every organization thus needs technical support that is swiftly available to all. The personnel must also be provided with training on the use of devices and applications (Liu et al. 2018).

Remote leaders should ideally contact their team daily to apprise them of the team's goals, priorities and progress, including that of other members (Reyes et al. 2020). Regular messaging allows the team to stay informed of daily matters and strengthens interpersonal relationships and team spirit. Remote leaders require the ability to create a positive work environment, improve notification and cooperation and to manage change through various virtual information and communication technologies (Roman et al. 2018).

Interaction and notification in remote leadership can be improved by using technology best suited to the situation, expressing things clearly, being in active contact with one's subordinates and supporting them, reacting swiftly to things and being open and inclusive. Often supervisors only use technologies familiar and comfortable to them without considering whether another technology would be more suitable to the task. E-mail, chat and notice boards are suitable for delivering one-way routine information, but delicate or disciplinary matters or complex tasks and problems are better conducted through video conferences. Matters such as meeting times, training schedules, system problems or procedure changes are well-suited for e-mail. The ability to express matters clearly is also highly significant in virtual environments. Supervisors often believe they have expressed themselves clearly while their readers disagree (Hill and Bartol 2018).

Multichannel messaging includes many options for one-way and two-way communication, even though most in-person leaders only use phone calls, e-mail and text messages (Erjavec et al. 2018). Remote leaders should use all possible channels and consider which of them are best suited for their tasks.

Video conferences have become very familiar in the social and health care sector during the pandemic. It would be a good idea to activate participants with suitable tools such as e-polls (e.g., Forms, Polls, Kahoot) a whiteboard (e.g., Whiteboard, Answergarden) and other platforms that allow participants to write and draw (e.g., Flinga, Padlet). At their best video conferences are a rich and interactive experience, in which participants communicate with their voice, expressions, gestures and other materials. Remote leadership and remote work have increased the use of emoji in written texts. They can be used to advance an unofficial and collegial mood and help create a sense of cooperation between team members (Darics 2020, pp. 3–29).

Remote leadership requires innovative solutions on how to build closeness and trust remotely. A good example of this is Turesky et al.'s (2020) study, in which a supervisor created various topical videos in which they also shared details about their hobbies and interests. The videos became so popular that their subordinates wanted a new one every week.

Supporting Teams

Enabling the productivity and performance of workplaces and teams requires setting realistic goals and measuring achieved results (Cowan 2014). It is important for subordinates to receive feedback on their progress, such as a weekly e-mail from a supervisor summarizing the team's goals and progress (Reyes et al. 2020). Supervisors should also encourage and reward their team for results and good practices. Transparency is vital in leadership, as it increases trust. An atmosphere of high trust is the basis for the entire workplace's productivity and performance (Turesky et al. 2020).

When working remotely, trust is a critical factor in enabling productivity. Team members should signal their reliability by e.g., explaining how they handle various situations or by replying quickly to messages. It is also important for team members to give each other feedback, share their thoughts on the team's potential challenges pre-emptively and to maintain a positive and solid attitude towards work. The supervisor can support the team by communicating transparently and inclusively and by including the entire team in important communications and decision-making. It is important to actively ask the team to suggest different perspectives, ideas and approaches so that the team may find the best solutions to different situations (Hill and Bartol 2018).

Supervising work remotely requires good communication. The line between work and leisure time can become blurred to both the supervisor and the subordinate, which may cause a temptation to work overtime to move forward faster. This is particularly likely for highly motivated individuals. Social connections may also become limited to just one's family and local friends. Remote work can encourage a workplace culture where work e-mails are sent late and one is always working and sitting. This challenges supervisors to observe both their own and their subordinates' welfare at work (Grant et al. 2013).

Methodology

Research Design

This study was conducted as part of the EU-funded national *The More Remotely – work in social and health care is changing* project (2019-2022). The project seeks to respond to the transformation of the Finnish social and health care sector by developing remotely conducted leadership, work guidance and peer support, by improving change leadership and by strengthening personnel's skills in these areas. The project is coordinated by the Tampere University of Applied Sciences with the participation of the Satakunta University of Applied Sciences, the University of Lapland and the University of Eastern Finland.

In Finland, the responsibility for the general planning, directing and drafting of relevant laws of home care and home services lies with the Ministry of Social Affairs and Health. The services provided by home service and home nursing are intended to support its clients' ability to live at home. Home service is based on the Social Welfare Act, while home nursing is based on the Health Care Act. Municipalities can combine the two as home care (Ministry of Social Affairs and Health n.d.). Home service includes various tasks and activities (or assistance with them) related to habitation, care and maintaining the client's ability to function (Social Welfare Act 1301/2014). Home nursing is arranged based on the patient's care and service plan or temporarily at the patient's residence, home or comparable location. Home nursing is a multiprofessional health and nursing service (Health Care Act 1326/2010).

This article presents research findings on the realization of remote leadership in home care in the Pirkanmaa region in Western Finland. The purpose of the study was to chart remote leadership's positive effects, functioning practices and challenges. The goal of the study was to gain new information on the functioning and development needs of remote leadership during the pandemic, which can be utilized in the project and its target organizations, leadership in the social and health care field and leadership training. This article answers the question: "How is remote leadership realized in the home care of the Pirkanmaa region?"

Data Collection and Analysis

As part of the *More Remotely – work in social and health care is changing* project, a year-long training program was organized for supervisors (N=60) working in home care that included both in-person and remote meetings. The supervisors were also given training through remote job guidance and peer support. Nine (n=9) of the supervisors who participated in the training also participated in a remote group interview that was conducted via the Teams video platform in Autumn 2020. At the time of the interview the supervisors had approximately eight months of experience of leadership during a pandemic. A second set of data used in this study consisted of assignments submitted by the supervisors (n=60) as part of the training and memoranda written by the training groups (f=17).

At the beginning of the project, research permissions were sought from all municipalities and organizations participating in the project. The goal of this study was to gain an understanding of supervisors' personal experiences in their own reality and the objects of the study were behavior, emotions and experiences (Holloway and Galwin 2017, p. 3). The structure and contents of the themed interview was created based on a broad literature review and the intelligibility of the questions was tested on members of the research group. No background information was gathered on the interviewees, as they had participated in the training groups. Good scientific practices and ethical principles were followed by the researchers. Prior to the interviews, each participant was sent a notice on scheduling and a link to an e-form, if the participant had signed a form in which they consented to being interviewed and having their interviews used as part of scientific research. The interviews were saved for data analysis and destroyed after the study was finished. The interviewees were informed of the voluntary nature of the interview and of their possibility to leave the interview if they so desired. Transcribed, the interview data consisted of 26 A4 pages written in the Arial font using font size 12 and 1.0 spacing.

The documentary data consisted of assignments written by the participants and 17 memoranda written by the training groups. They clearly contained sections that were based on literature rather than the supervisors' own thoughts and views. These sections were left out of the analysis. As some of the memoranda had identical or nearly identical titles, they were numbered. This can be used to show that the data has been used broadly.

The data were analyzed through data-based content analysis. The transcription was performed by writing down the interviews word-for-word without changing the replies or the expressions they used. The transcription did not mark pauses or tone of voice. After the transcription, the data were reduced by removing portions irrelevant to the study question. After reduction, the data were clustered into a new logical whole by searching for similarities in the data. After clusterization, the data were reduced again. After the data had been grouped into subcategories, each group was named with the concept that best described its contents. The subcategories were then abstracted into categories and main categories (Hsieh and Shannon 2005). Table 1 contains an example of the process of content analysis.

Table 1. *An Example of Content Analysis: Challenges of Remote Leadership*

Reduced expression	Subcategory	Category	Main category	Connecting category
Clear ground rules	Clarity of ground rules	Factors that support managing diversity	Diversity in the workplace	
Regular meetings	Regularity of meetings			
E-communication media	E-communication media			
Weekly bulletin	Weekly workplace bulletin			
Cultural differences	Cultural differences	Factors that form diversity		
Knowledge	Personnel's level of know-how			Challenges of remote leadership
Skills				
Age	Different ages			
Educational background	Different educational backgrounds and professional groups			
Professional groups				
Incapacitated workers	Incapacity			
Different ways to work	Different work methods			

Results

Positive Effects of Remote Leadership

According to the supervisors (n=9), remote leadership has brought several positive things to their leadership. Work is no longer tied to a place and no time is spent on commuting. They felt that sharing information is now faster, more real-time and available to all simultaneously. They considered e-communication reliable and thought it had made communication within the workplace more seamless (see Table 2).

Table 2. *Central Positive Effects of Remote Leadership*

Work is no longer tied to a place
No time is spent on commuting
Sharing information is faster and more real-time
Information is available to all simultaneously
E-communication is reliable
Work is more efficient, productivity has increased
Increased opportunities
Organizing meetings is easier
Saving time and expenses
Less overlapping work
Expressing one's self and opinions is easier

The supervisors reported that remote leadership had made work more efficient and productive and the use of resources more flexible and efficient. They had also found that remote leadership made it easier to utilize the strengths of their subordinates. The supervisors also believed that there were more opportunities related to topics such as participation and multi-professional cooperation. They saw video conferences as a positive, as organizing and participating in them despite distances was easier than in in-person meetings. Meetings stayed on topic better and granting the right to speak was clearer than in in-person meetings. They also reported various savings caused by remote leadership, such as with time and expenses (see Table 2).

> "…the work is made easier when you don't always have to look for parking spaces"

> "…it has now been possible to get together and share things much more often than before, just so when this is so easy...Through remote connections, it can be repeated more often and more easily"

> "Remote leadership is ... a model that allows for multi-professionalism ... it also enables such over-organizational co-operation"

The supervisors believed their task had become easier due to remote leadership, as it has removed overlapping work and made work more flexible. They also thought that work had become more free and easier to influence. They also considered target dates easier to meet, as there are fewer interruptions to work. Remote leadership and remote work was seen as a positive particularly for younger workers. The results also showed that supervisors believed it was easier to express oneself and one's opinions while working remotely (see Table 2).

The Functioning of Remote Leadership

The results showed various factors that affect the success of remote leadership. One significant factor was subordinates' individual characteristics, of which things such as age, attitude and skill level were mentioned. The respondents also believed it was important for supervisors to consider their subordinates' individuality. The overall functioning of the workplace affects remote leadership as well. Some such factors that were mentioned include the sense of trust and familiarity at the workplace and the team's ability to self-direct and cooperate (see Table 3).

Table 3. *Factors Affecting the Functioning of Remote Leadership*

Subordinates' individual characteristics (age, attitude and skill level)
Consideration of subordinates' individuality
Functioning of cooperation at the workplace
Sense of trust at the workplace
Team's ability to self-direct
Supervisor's motivational skills
Supervisor's know-how and interest
Implementing digitalization in practice

The supervisors' skills were also reported to affect the functioning of remote leadership. Supervisors should be able to motivate their subordinates and have sufficient skills and interest to use technological tools. Supervisors should also implement digitalization in practice. Supervisors also mentioned their own ability to influence their own work as a contributing factor to the success of remote leadership (see Table 3).

> "…trust is an important starting point in all communication."
>
> "…the team is self-directed…"
>
> "…after all, it is based on knowing each other…"
>
> "... the supervisor motivates his employees to use technology…"
>
> "If a supervisor isn't interested in these kinds of electronic tools, then at least it won't encourage employees either."

Challenges of Remote Leadership

The results show that supervisors also faced challenges in remote leadership. According to their experiences, the challenges presented in Table 4 are lessened and prevented by a workplace that functions well. Factors that contribute to a functioning workplace include trust, a sense of community, openness, respect and communication. Superiors believed it was important for subordinates to have a clear understanding of their role at work. Common agreements, regularity and clarity in general were seen as factors that reduce challenges. Supervisors may survey emerging challenges by observing the workplace and gathering feedback.

Challenges related to technology included applications that run slowly or do not work. Other challenges include the constant need to learn more and deficiencies in training and guides. Having an inaccurate understanding of one's subordinates' level of technological skills may also cause challenges. Technology also involves security risks, which the respondents considered a challenge to remote leadership (see Table 4).

> "…we have some kind of common goal that will then be achieved"
>
> "…the staff hopes that supervisors will be well available"
>
> "It is different when there is no physical interaction between people…"
>
> "…if employees don't do the things they should be doing…"

Remote leadership and remote work were also seen as causing challenges to welfare at work, both to supervisors and subordinates. Medical leaves, a sense of loneliness and problems related to alcohol were believed to increase due to remote work. The supervisors thought that remote work was more challenging to older personnel. They also believed that remote leadership had increased anonymity, unavailability and distance between members of the workplace (see Table 4).

Table 4. *Central Challenges of Remote Leadership*

Committing subordinates to the organization and its work culture
Measuring work performance
Subordinates' ability to self-direct
Supervisor's unavailability
Diversity in the workplace
Following employee stress
Noticing problems in the workplace
Technology
Deficiencies in training and guides
Inaccurate understanding of subordinates' level of technological skills
Security risks
Workplace welfare
Lack of knowledge of video conference practices
Amount of work
Demand of being constantly available

The supervisors mentioned various challenges related to video conferences, even though they also saw them as a positive. Some of the challenges they identified included a failure to fully learn the importance of remote meetings or how to request permission to speak in meetings. On the other hand, requests to speak were sometimes overlooked (see Table 4).

> "…after all, this can create that loneliness ... so others will suffer loneliness ... then some people are excluded themselves out of the work community and many people have had alcohol problems ...
>
> "... for older workers, it can indeed be a great effort ... and it can lead to sick leave ... Some may be exhausted ..."
>
> "…everything has to be learned by yourself…"

The lessening of overlapping work and the easing of the supervisor's job, which were seen as positives, were also discussed as challenges. The supervisors reported having so much work they could not clear it all, nor could they absorb all the information sent to them. They also believed that remote leadership had lessened freedom and the ability to influence things at the workplace. They had experienced an increase in their responsibilities and demands on them caused by factors such as the requirement to be constantly available. The supervisors also discussed situations where strong-willed employees had adopted roles that did not belong to them, which causes its own set of challenges to leadership (see Table 4).

Discussion

This study charted the positive effects, functioning practices and challenges of remote leadership in the home care of the Pirkanmaa region. Sixty supervisors participated in the study, of whom nine (n=9) agreed to the voluntary group interview.

This study found many advantages to remote leadership, such as savings in time and costs, swift and real-time sharing of information and improved productivity. Digital communication media can be used quickly and effectively, as has been found in other studies (Cowan 2014, Hill and Bartol 2018). The responders felt that virtual meetings were quick and fast to organize, which saved time and funds. However, Reyes et al. (2020) also found it important to organize unofficial meetings, in which people can socialize in a more relaxed atmosphere.

One surprising result was the supervisors' observation that it is easier for participants to express themselves and their opinions in virtual meetings than in in-person ones. Similar results were not found in other studies. A reason for employees' increased courage could be the ability to deactivate the camera, which allows one to speak without showing one's expressions and gestures. However, participants would ideally use cameras during video conferences, as it makes interactions more life-like. Employees' unwillingness to discuss things openly in-person may also suggest problems with the supervisor's leadership and the workplace's atmosphere and intra-personal relationships. However, the willingness to talk more during remote meetings may also reflect the employees simply missing each other.

According to the results of this study, the functioning of remote leadership is affected by employees' individuality and its recognition (e.g., age, attitude, level of technical skills), as was also discussed by Poulsen and Ipsen (2017) in their study. Supervisors' technological skills and willingness to learn more heavily affect the implementation of digitalization at the workplace, as was discovered in earlier studies (Roman et al. 2018, Cowan 2014, Maduka et al. 2018, Liu et al. 2018). The impact of cooperation and trust at the workplace on remote leadership was mentioned as a significant factor in the interviews. Earlier studies (Newman et al. 2020, Breuer et al. 2016) have found that trust increases teams' ability to perform and cooperate. Supervisors' ability to build trust and encourage and motivate their subordinates affects the functioning of remote leadership, as was also found by Turesky et al. (2020).

The interviewees mentioned several challenges of remote leadership, such a work welfare and committing employees to the organization and its work culture. Reyes et al. (2020) suggest that employees' commitment to the team and organization can be increased during remote work through unofficial meetings such as virtual happy hours. The supervisors who participated in this project did not discuss organizing unofficial communication. This may however be caused by the fact that all the supervisors regularly met with their subordinates in-person.

Onnis (2015) emphasizes how sufficient support from the supervisor to their subordinates increased work welfare and employee retention. Remote leaders also have challenges in detecting problems at the workplace-level and the amounts of employee stress. The blurring of the line between work and leisure time may tempt some to work overtime, which may become a risk to work welfare (Grant et al. 2013). Technical challenges, such as slow or non-functioning applications, were severe as workplaces switched to remote leadership due to the pandemic. Purvanova's (2014) study found similar technological challenges related to remote leadership.

Based on the results of this study, the greatest development need in remote leadership is in supporting the use of various programs and tools. Workplaces need better guidance and support should be easier to reach, as was also found by Liu et al. (2018). According to the supervisors' experiences, various applications should be used more effectively both in leadership and in guiding employees. According to the results, ground rules related to remote leadership should be clarified more, which Cowan (2014) also found. The culture of remote leadership should be implemented better in practice. Stratone and Vätämänescu (2019) suggest that remote leaders should consciously help create an identity and culture to the workplace. As for remote conferences, the supervisors thought that meeting practices should be clarified. It would also be important to better chart the level of technological skills within the workplace.

This study was conducted at a historic time, in the middle of the pandemic, which has given valuable and concrete information about the development needs of remote leadership. In the future, remote leadership will be considered a core competency expected of supervisors (Busse and Weidner 2020). The results of this study show that practices related to remote leadership should be clarified in the home care of the Pirkanmaa region. Technological skills, functioning technology and swift access to support in various situations are important from the perspective of efficiency (see Table 5).

It would be highly important to further develop guidance related to the use of technology, as lacking technological skills are a major hindrance to successful remote leadership. Workplaces should have a skill level high enough to use various applications and tools, as it is the only way of implementing functioning remote leadership. Organizations should collect more feedback related to remote leadership and disseminate information about how remote leadership has affected things such as work welfare and the Finnish nurse shortage (see Table 5).

Table 5. *Central Development Needs of Remote Leadership*

Practical knowledge of various applications and tools should be increased through guidance and better access to support
The use of application should be expanded in both remote leadership and employee guidance
Ground rules related to remote leadership should be clarified
The culture of remote leadership should be implemented better in practice
There should be a clear schedule to the execution of hybrid leadership
Practices related to video conferences should be clarified
Remote leadership should be taught as part of basic studies in the social and health care field
Organizations should gather constant feedback on the functioning of remote leadership

On this basis it would be wise to consider the supervisors' suggestion of teaching remote leadership as part of basic studies. By learning about remote leadership and further developing it, the social and health care field will remain on pace with modern trends. Remote leadership should be considered more broadly as part of social and health care studies.

Conclusion

Remote leadership has constantly developed within organizations during the pandemic. While restrictions will end and activities will become free, the practices learned during the pandemic should continue to be used and further refined.

Near-term challenges in every organization include modeling, implementing and clarifying the culture of remote leadership. This requires involving the entire personnel and thus creating common ground rules. Implementing remote leadership requires investment in technological tools, applications and training for the personnel.

It is important to conduct further research on the realization of remote leadership and the formation of its culture in the target organizations.

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Organizational Support, Communication Skills, and Job Satisfaction in the Learning Organizations

By Dursun Eğriboyun[*]

The purpose of this research was to determine the mediation effect of the organizational support provided to the administrators and teachers and their communication skills to their job satisfaction in the schools that are learning organizations at the same time. The participants of the research were composed of the school administrators and teachers and joined voluntarily to the research. In the research, the purposeful sampling method has been used. The research groups were composed of 300 administrators and teachers. This research is a study in the relational screening (survey) model. The research is both descriptive and explanatory in terms of its purpose because in the theoretical framework learning organizations, communication skills, organizational support, and job satisfaction have been addressed in all their parts and tried to be defined concerning all the various perspectives and approaches. In the research, the data were collected with a scale. According to the results of the research, it was not found statistically meaningful that the learning organization practices had a relationship/regression on the job satisfaction perceptions, and the organizational support provided to the administrators and teachers and their communication skills did not mediate to the job satisfaction in the educational organizations.

Keywords: *learning organizations, communication skills, organizational support, and job satisfaction*

Introduction

Today, learning organizations, organizational support, communication, and job satisfaction are the concepts that almost everyone knows and uses, especially in public administration and teaching institutions. However, whether both managers and employees use these concepts superficially or if they are familiar with the theoretical foundations of the subject has become an issue that should be examined and discussed in today's management approach. The main problem of this research is examining the extent to which job satisfaction in learning organizations will vary through organizational support and communication skills. Therein, the main purpose of the research, which is the basis for the formation of the theoretical framework and research hypotheses, is to reveal how the assessments of the job satisfaction in teaching institutions, that also assume the role of learning organizations, varies according to the dimensions related to the organizational support and communication skills in their schools. In this context, it was concluded that the managers and teachers may have meaningful relations between their own perceptions of the dimensions of the learning organizations in their schools, the organizational support behaviours provided to them in their institution, and their

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assessments related to their communication skills and job satisfaction. For this reason, various domestic and foreign sources, as well as theoretical and etiquette research results were evaluated and resulted in research model and inter-concept relations.

Together with two intermediary variables, i.e., organizational support and communication skills, job satisfaction appears to be an important management concept that can be extended from mutual individuals to organizations and even international organizations. Therefore, the problem discussed in the research should be, in fact, addressed within the integrity of the organization. When the concept of the organization is expressed in the research, mention is made to a system that comprises the activities of two or more people (Kaya 1999, p. 111).

To date, a wide range of research has been and is still being carried out in the organization and management. Considering that the organization is a structure, in a nutshell, establishing very good communication in this structure in terms of cognition, emotion, or behaviour, the formation of the organizational support, as well as the positive increase of the job satisfaction through this provided environment is an issue that should be emphasized. Here, too, the managers have important duties because when it is evaluated that the management is a process, it is the managers who will continue the process smartly and positively. In this sense, what the learning environment is, which the learning organizations, the organizational support, and communication skills are, how they can be provided for, and improved, what the job satisfaction is, or which the motivators are, and how they should be developed all are key issues that need to be examined in today's management approach. The managers are on the point of being brought into the spotlight, because the healthier the relations in this regard, the more efficient the organization will be, and the final outcome is no other than job satisfaction.

Naturally, administrative behavioural patterns also play an important role here. In most research, the management activity requires working with others, on the one hand, but it also requires achieving objectives, making the most use of scarce resources, ensuring efficiency and effectiveness, and operating in the changing environments, on the other hand (Özalp 2006, p. 3). If it is accepted that management is also a social activity, one can readily understand the extent to which concepts investigated are related and intertwined. Similarly, as the definition of management shows, positive organizational support and communication techniques should be used to work with others. To accomplish the objectives of the organization, the employees must be well directed because satisfied employees are needed to provide efficiency against effectiveness. In addition, to rationally use the limited resources, the theories of job satisfaction must be fully enforced.

The changing environment also affects job satisfaction. Therefore, intrinsic and extrinsic job satisfaction should be balanced very well. Of course, communication and communication skills should be used while ensuring job satisfaction, because one of the management functions that can be effective is also considered communication when it comes to the management functions in a broad sense (Berberoğlu 2006, p. 107). The communication process is at the heart of all management processes, too. No organizational action or management process can be carried out without communication because communication is the lifeblood of

human relationships and motivation, accordingly job satisfaction (Kaya 1999, p. 107).

Also, as Gudanowski (1995; as cited in Efeoğlu 2006, p. 7) emphasized, job satisfaction is defined in different ways as a happy and positive mood based on an employee's work, their professional experiences, their pleasure from the work which varies according to the values they have, the harmony between expectations of their work and the rewards they get from their job, their attitude towards their work, a result of their attitude towards their work and their emotional reactions to their work.

In recent years, the behaviours aimed at increasing effectiveness and efficiency in organizations have been widely examined in the specialized literature. The issue of organizational support has especially been one of the issues gaining great importance due to the environments created by competition chaos, and uncertainty in the business world of the 21st Century. Therefore, if the organizations should focus on the needs of their employees and try to satisfy them, this would help the employees feel valued, talented, useful, and necessary. This would also bring up the concept of organizational support herewith (Köse and Gönüllüoğlu 2010, p. 87).

In today's business world, employees feel the need to receive support within the organization where they work due to human psychology. Organizational support which is extremely important for employees has been one of the important resources for meeting emotional needs such as respect, acceptance approval, and appreciation. With the organizational support, personal needs such as belonging, and being respected and being approved are met with by stating that the contributions of their employees to the organization are aware, their well-being is valued, and they like to work with them (Armeli et al. 1998, as cited in Özdemir 2010, p. 133, Martin 1995, as cited in Akın 2008, p. 42).

To make the concept of social change operational, Eisenberger et al. (1986, p. 504) argue that there is a wide variety of situations that affect an employee's behaviours and that the underlying cause of these behaviours is the motivators reflected in the employees' organization, and therefore they use the concept of the perceived organizational support in their definitions when describing the organizational support.

It is evaluated that the perceived organizational support which means meeting an employee's expectations such as being valued by the organization they work for, not feeling alone on good or bad days, and seeing the support of the organization behind, will also be effective in connecting the employees with their organizations in this context (Turunç and Çelik, 2010, p. 184).

In the light of these evaluations, it is thought that there should be a balanced relationship between the realization of the objectives of the individual and those of the organization, and the communication to be provided for this purpose should provide satisfaction to managers and employees alike. In this context, communication skills and job satisfaction concepts in management have become a subject worth examining for both managers and employees with all their dimensions, scopes, effects, and results. In the literature review, it has become obvious that there are not enough studies on this subject in Turkey yet. The above-

mentioned principles and reasons also reveal the necessity of further research on this subject. Therefore, the perceptions of the managers and teachers working in the schools regarding communication skills turn out to be a meaningful mediator of their job satisfaction and this has brought along yet another problem that is the subject of the research.

According to the findings of the many types of research carried out in this direction, it was evaluated that learning organizations are one of the most important factors affecting job satisfaction. Learning organizations, communication, organizational support, and job satisfaction in educational institutions are not newly discovered phenomena. These concepts have long been known, believed in the benefit, and implemented approaches. However, their applications are limited to individuals and cannot be institutionalized enough. In specialized literature, mention is made to different researches which were carried out in different fields such as psychology, business, health, tourism, etc. in their relation to these concepts. However, in these carried out researches, especially in official educational institutions, the frequency of finding applications in the subject highlighted above is quite limited. Therefore, research-wise, the perceptions of the administrators and teachers working in the schools related to these practices, their relationship between them, and their effects on each other were trying to be in focus.

Literature Review

Organizational Learning and Learning Organizations

In the realization of organizational learning, it is necessary to primarily examine individual learning rather than the learning that individuals create by coming together, creating the group dynamic characteristics, as well as learning based on the organization that the groups form together. For this purpose, the learning levels are examined under the titles such as individual learning, group dynamics, team learning, learning in organizational integrity (organizational learning).

The concept which was first used in management science in 1990 in Peter Senge's book "*The Fifth Discipline* (1990)" quickly became one of the most frequently repeated terms in today's human resources literature, in a short period of time. According to the definitions mentioned in the book, the learning organizations are briefly the organizations that know, understand and think. The concept of the learning organization means that a business can draw conclusions from the events that it is constantly experiencing, at the same time, adapting these into changing environmental conditions within a system in which it can help its employees grow, and as a result, it is a dynamic business that is constantly changing, developing and renewing itself.

Also, organizational learning is a process by which the members of the organization learn the objectives, norms, value systems, behavioural patterns, and the culture of the organization, briefly (Hofstede 1989; as cited in Töremen 2001). Today, the concept of organizational learning is increasing among organizations that are more inclined to change. Learning is a dynamic concept and in this context,

it is emphasized that the structure of the organizations is constantly changing. The goal is to make the transition from individual learning to organizational learning at an increasing pace. Just as learning is essential for the development of the individuals, learning is essential for the development of the organizations at the same time (Fiol and Lyles 1985; as cited in Töremen 2001). The main purpose of organizational learning is to ensure that the organization as a whole adapts easily to this change and, if possible, leads the way in this change, despite the changes in the business environment (Martha and Victoria 1996, as cited in Yıldırımışık 2001).

The organizational learning theory can also be an optimal model for educational organizations. Because the main mission of the school organizations is to provide a more effective education and training service the school is an organization that is engaged in the process of learning directly. But the main problem is reaching a balance between the school's learning and teaching mission. Today, schools look more like teaching organizations. However, a school has to be both a learning organization and as well as an organization that teaches. The transformation of the school into a learning school requires a radical paradigmatic change in the school culture and philosophy (Çelik 1999, p. 117).

Being a learning organization requires having qualities beyond organizational learning. Therefore, some elements need to come together in the learning organizations. Each of these elements has respective importance and to become a learning organization, each element must be developed both separately and together. These elements will provide a vital dimension in the establishment of the organizations that can actually "learn" as Senge (2003, p. 15) emphasized.

Communication and Organizational Communication

Man tries to communicate with his environment from the moment he is born. The developing technology facilitates communication while the complex world makes communication increasingly difficult. Therefore, communication nowadays has become a tool that is technically known by a person and with that, the person should well develop their skills (Ersanlı and Balcı 1998, p. 7).

The organization is often defined as a communication network. It is not possible to think of an organization without a communication process. In the organization, the management also functions as a source of communication (Kaya 1999, p. 106). Baltaş and Baltaş (2002, p. 19) briefly define the concept of communication which is such an important issue as the sharing of feelings, thoughts, and information with others in every conceivable way. The word "communication" is also defined by the words such as correspondence and information, in our language. To describe it broadly, it is to provide an understanding among people through other tools which are verbal or non-verbal, to achieve the desired results and influence behaviours (Can et al. 2001, p. 288).

Organizational communication, on the other hand, is a social process that develops both between the various departments and the elements that make up the organization, or between the organization and the environment allowing for a continuous exchange of information and thoughts or establishing the necessary

relations between the departments to ensure the functioning of the organizations and enable the achievement of its goals (Demir 2003, p. 136). The process and the way in which information, feelings, or thoughts are rendered and behaviour carried out is created is also called the communication process (Baltaş and Baltaş 2002, p. 26).

There are also some basic features in communication. Baltaş and Baltaş (2002, 19) explain that the first impression in the communication is important, that the communication is made by the person, not to the person, that the communication is a whole, and that the main feature of the communication is embraced by understanding. In terms of the characteristics of the research, interpersonal, internal and, mass communication is the subject that should be emphasized. In order for a communication act to occur, there must be mutual two people. In addition, since management is carried out within an organization and against an audience, the communication that is realized both between the executive-employee and groups coincides with the source of the job satisfaction. Considering that communication is the most important tool of job satisfaction, communication covers every moment of the working process within the organization and is a phenomenon that will be needed on a regular basis.

Communication also has some functions. Therefore, the managers have to know this issue as well. Demir (2003, p. 137) describes the functions of communication as being the provision of information, persuasion and influence, consolidation, and finally commanding and instructive functions. Paying special attention to it will also see that these are the functions which should be carried out by a good manager at the same time. Also, Türkmen (1992, p. 24) explains in more detail the basic functions of organizational communication. However, in his explanation, the most important issue concerning this research is that organizational communication is one of the most effective tools that the management of the organization will implement to ensure planning, coordination, decision-making, motivation, and supervision in the organization.

In addition, another issue that is emphasized in terms of communication is the tasks of the communication. Demir (2003, p. 138) also identifies these tasks as control, motivation and satisfaction, expression of emotions, and transmission of the information. These tasks are also the functions that the administrators always perform. The concept that should be emphasized carefully here is satisfaction because this research focuses on communication skills and job satisfaction. Varol (1993, p. 128) considers this issue within the purposes of organizational communication. When these objectives are evaluated, it will be seen that they are generally the subjects that are involved in communication skills. These are;

- To ensure that the objectives, goals, and policies of the organization are known by the employees.
- To transfer immediately the changes in the organization to the employees.
- To provide information about the social and economic problems of the organization and to enlighten the employees about their connection to their general social and economic problems.

- To inform the employees about the jobs and process and to facilitate the work and skills training in this way.
- To enlighten the employees about activities, important events, and decisions of the organization.
- To encourage innovation and creativity to regulate the flow of information between management and employees and to provide feedback.
- To encourage and improve mutual communication between managers and employees.
- To inform the employees about promotion opportunities in the carrier, projects related to the employees, expectations for the future.
- To improve the qualifications of the employees to represent the organization during and after work.
- With all this and other communication activities, trying to create and maintain a climate, culture, and identity of the organization.

Types of the Communication

Can et al. (2001, p. 288) stated that the organizations have two main objectives of communication. The first of these is coordinating the activities to accomplish the objectives of the organization and to pass the task to the related person concerned. The second is that the members of the organization are revived to achieve the organizational plans willingly and enthusiastically through communication. There will be formal and informal communication here.

However, this research will focus on cognitive (mental), emotional and behavioural forms of communication which are presented as communication skills in the researches of Ersanlı and Balcı (1998, p. 9). When researches are evaluated in general, the ability to communicate can be defined as being able to express one's self clearly, fully, and in the same way, understanding exactly and accurately what they say by listening to other people. In this context, emotional communication is considered a process of the mutual influence between the feelings of people who communicate (Bartsch and Hübner 2005, p. 2). In addition, emotional communication refers to the process of using messages so that individuals can exchange the information they have with each other to affect mutually each other's emotional states.

Most simply, the messages can be a direct verbal or non-verbal expression of the emotions such as smiling and saying "I am so happy", or they can be expressed complexly and sharply, or they can be emotionally weaker. Messages can also be used to share information or influence the feelings of others through alerts or advice. In short, all communication, albeit to varying degrees, is emotional (Planalp 2009, p. 489).

Behavioural communication is a form of communication that people use psychologically in their daily behaviour. It is also defined as a more direct and clearer form of communication as a variable of the individual differences that indirectly express the feelings, needs, and thoughts of a person related to daily life (Wikipedia 2021, accessed at Behavioral Communication).

According to the Northeastern University, the Department on Traumatic Brain Injury Resource for Survivors and Caregivers (2021), cognitive communication is considered as a process that allows people to successfully perform their functions and enables them to interact meaningfully with each other. When focusing on cognitive communication in literature, it becomes obvious that the focus is on knowing, perception, and thinking in general. In explaining the importance of cognitive communication, the American Speech-Language-Hearing Association (2021) emphasized the issue more by explaining what its consequences and effects can be when it is missing. In this context, they stated that the awareness and abilities will decrease in the provision of the effective communication needs, that there will be a lack of memory, judgment, and ability in the effective exchange of routine information, that the lack of social communication skills and the required ability to manage emotions can also lead to the loss of the relationships, that the ability to perform educational or professional roles will be destroyed, perhaps the potential work will be lost, etc.

Granvold (1994, p. 224) also investigated the cognitive and behavioural qualifications of interpersonal relationships. The researcher mentioned the knowledge related to interpersonal relationships and detection-decision making as well as cognitive restructuring skills as cognitive competencies, and manifesting themselves, initiating the relationship, maintaining the relationship, and resolving the conflict as behavioural competencies.

Organizational Support Theory

The organizational support theory is a hypothesis of the modern social change that suggests that the employees show positive results related to work in exchange for the evaluated resources such as payment, education, socio-emotional support from their organization (Michael et al. 2005, as cited in Kaplan 2010, p. 41). According to the theory of organizational support, Byrne and Hochwarter (2008, as cited in Kaplan 2010, p. 41) state that employees personalize the organization by improving the changing relationships that vary on the impact and strength of attitudinal and behavioural responses, and that the combining of the employees' organizational membership with their own identities until the socio-emotional needs are met strengthens social change relationships, and increases performance levels. These relationships depend on the psychological processes which are envisaged by the theory of organizational support and can be expressed as the employee's belief that the attitude of the organization is originated due to his desire, feeling compelled to help the organization, the satisfaction of the socio-emotional needs and the expectation of the work are of succeed-reward type (Rhoades and Eisenberger 2002, p. 699).

The theory of organizational support also addressed the psychological process that constitutes the results of the perceived organizational support. First of all, the organizational support perceived on the mutual norm should reveal a sense of the necessity to take care of the welfare of the organization and to help the organization achieve its objectives. Secondly, the interest, approval, and respect that are shown by the perceived organizational support should fulfill the socio-emotional needs

which lead the employees to combine their organizational membership and role status with their own social identities. Thirdly, the organizational support should reinforce the employee's beliefs that the organization defines and rewards the increased performance. These processes have positive results for both employees and the organization (Rhoades and Eisenberger 2002, p. 699).

Kaplan (2010, p. 42) has also concluded in his research related to the organizational support theory that employees have developed global beliefs the contributions of which organizations evaluate taking care of their well-being, to determine the willingness to reward the organization's increased efforts and to meet the socio-emotional needs by considering the development, nature, and consequences of the perceived organizational support. There are also different dimensions of support in the organizations. For example, the support that the staff perceives from the organization they work for is called the organizational support, and the support which is received from its managers is called the manager support (Akın 2008, p. 143). It is possible to summarize the main issues that constitute the concept of organizational support from the following definition as it is summarized in the research of Köse and Gönüllüoğlu (2010, p. 87).

- Valuing the contribution of the organization's employees.
- Caring about the happiness of the employees of the organization
- Trusting each other, whether you are the organization or the employees.
- Voluntary about the policies, rules, and activities affecting employees.
- Organizational support does not change according to instant events.

Job Satisfaction

People spend most of their daily lives at work from a certain age to continue their lives and meet some psychological needs. In this context, the person who has the expectations of their work achieved can be happier as what is affected is not only their economic situation but also their psychological situation. Therefore, job satisfaction has an important role in human life both economically and psychologically (Bakan and Büyükbeşe 2004).

Job satisfaction is a whole of positive feelings towards the work of the individual. It can be said that the workers love their work and develop very positive values towards their work when it is mentioned that their job satisfaction is high (Ceylan 1998, p. 125). According to Robbins (1986, p. 104), job satisfaction is the general attitude towards an individual's work. It is an emotional reaction that arises from the perceptions of the person that realizes their important work values or helps realize it, therein the values occur to the extent appropriate for the needs of the person.

The purpose of the research on job satisfaction is explained in the existing literature to diagnose the potential problems in organizations, to uncover the causes of the absences and lay-offs, to evaluate the impact of the organizational changes in the attitudes of employees, to promote good communication between the management and employees, to provide accurate information in the conflicts between the management and the union (Karadal 1994; as cited in Becerikli, p.

2007). Based on these, it can be said that the main purpose is the motivation for and participation in the human for production, in other words, channeling human behaviour in the direction desired by the management of the organization.

Basic Approaches to the Job Satisfaction

The issue of job satisfaction has impressed social science researchers. More than 4,000 articles were published on this subject until the early 1970s. The theoretical foundations of job satisfaction were formed by Maslow's Theory of the Hierarchy of Human Needs and Herzberg's Double Factor Theory. Maslow's Hierarchy of Needs, Herzberg's Double Factor, and Adams's Theory of Equality are motivational theories, but they are also major studies that examine job satisfaction.

Key Factors Affecting the Job Satisfaction

Although the factors affecting job satisfaction were defined by different authors in many different ways, Ateş (2005, pp. 96-110) organized these factors into three main headings.

-Individual factors: The job worker's expectations of their business are primarily related to their characteristics. The key individual characteristics, the quality, and quantity of expectations for the job, and the job surroundings are the priority limiters. Individual factors include age, gender, level of vocational education, intelligence, experience, and personality.

-Organizational factors: Eight main organizational factors shape the job attitudes of the workers; the salary, the nature of the work, the opportunity for the promotion, the working groups, the working conditions, the management style, the communication structure, and the role structure. The individual provides different satisfaction on each factor.

-Numerical and environmental factors: Numerical and environmental factors are economic, social, technical, and state-owned affecting the individual. The individual has roles in business life, both around and outside the business. The social environment of the individual that is outside the organization is as important as it is within the organization. The level of job satisfaction of a worker can be determined by the social groups to which it belongs. In addition, it has been determined that job satisfaction is affected by social conditions.

The Purpose of the Research

A survey of the concepts of learning organizations, organizational support, communication skills, and job satisfaction in educational institutions has shown that these notions were partially investigated in some studies, but many types of research where they occur lack in explanations of the relationship or effect which is ascertained between them. In the studies on these concepts for the teaching institutions, there are domestic and foreign studies that indicate that the learning organizations positively affect job satisfaction and/or that the moderation effect of

the learning organizations is confirmed (Bil 2018, Nyukorong 2016, Chang and Lee 2007, Dekoulou and Trivellas 2015, Rose et al. 2009, Razali et al. 2013, Saykılı 2019). Similarly, reference is made to organizational support and communication skills, two notions that prove to have a positive effect on the job satisfaction (Karaalioğlu and Karabulut 2019, Oktar 2019, Afif 2018, Aktürk 2019, Tasnim and Akkaş 2017, Islam et al. 2014, Can 2020, Kellecioğlu 2019, Çelik 2019, Usuflu 2020, Karaca 2019, Yakut 2020, Sarıkaya 2019). Likewise, organizational support and communication skills mediate job satisfaction (Usman 2019).

In the light of these thoughts, the research aims to determine the mediating effect of the communication skills and the organizational support provided to the administrators and teachers working in the schools in Ankara, Bilecik, Bolu, and İzmir which are also learning organizations, in their job satisfaction. In this context, it has been evaluated that, to some extent, the research will shed light on the management performances within this system as well as on perspectives and stances of managers and educators against these innovative movements in education.

The Limitations of the Research

The scope of this research is limited to the opinions of managers and teachers working in secondary education institutions located within the borders of the Central district of Ankara, Bilecik, Bolu, and İzmir provinces regarding learning organizations, organizational support, communication skills, and job satisfaction in the 2021-2022 Academic Year. Additionally, the research is limited to the items related to these variables found in the data collection tool.

Methodology

Research Model and Research Problem

This research which tries to determine the type and the level of relationship between the learning organization practices, organizational support, communication skills, and job satisfaction, perceived by the administrators and teachers, is a study in the relational screening model. It is both descriptive and explanatory in terms of research purpose. Because on the theoretical basis of the research, the subjects of the variables were discussed in all aspects and tried to be defined by taking on various perspectives and approaches.

To achieve these goals in the above-mentioned literature, the research aims at providing an answer to the following questions;

- Is there a statistically significant relationship between the learning organization practices and job satisfaction perceptions of the administrators and teachers working in the schools?

- Do the communication skills and the organizational support provided to them have a mediating effect on their job satisfaction?

Research Group

In the selection of the administrators and teachers participating in the research, a sampling method was used, which the researcher was able to access at that moment so as to conduct his research and included the participants in his research on volunteering criteria (Cohen et al. 2007, Wallen and Fraenkel 2001). The sampling method used in this research is the purposeful sampling method because every administrator and teacher who volunteers are included in the sample until they reach the sample volume (Ural and Kılıç 2005, p. 39).

Table 1. *Demographic Information of the Participants*

Demographic Information	**Frequency**	**Percent**	**Valid Percent**	**Commutative Percent**
Statute				
Administrator	45	45.0	45.0	45.0
Teacher	55	55.0	55.0	100.0
Total	100	100.0	100.0	
Place of duty				
Public school	60	60.0	60.0	60.0
Private school	40	40.0	40.0	100.0
Total	100	100.0	100.0	
Educational background				
Graduate	56	56.0	56.0	56.0
Postgraduate	44	44.0	44.0	100.0
Total	100	100.0	100.0	
Service period				
5 years and less	5	5.0	5.0	5.0
6-10 years	20	20.0	20.0	25.0
11-15 years	15	15.0	15.0	40.0
16-20 years	20	20.0	20.0	60.0
21 years and over	40	40	40.0	100.0
Total	100	100.0	100.0	
Age				
30 and less	20	20.0	20.0	20.0
31-40	35	35.0	35.0	55.0
41-50	15	15.0	15.0	70.0
51 and over	30	30.0	30.0	100.0
Total	100	100.0	100.0	
Gender				
Women	15	15.0	15.0	15.0
Man	85	85.0	85.0	100.0
Total	100	100.0	100.0	

The research relying on this method was carried out in teaching institutions in Ankara, Bilecik, Bolu, and İzmir. The participants of the research are 300 administrators and teachers and it is obviously seen that this number is suitable for the purpose of research and statistical analysis. The demographic information of the participants who made up the research group is given in Table 1.

In this research, it was not necessary to examine the opinions of administrators and teachers separately on the variables, and, in general, the opinions of educators about the subject are kept at the forefront.

Data Collection Method and Tools

In the research, the data were collected from administrators and teachers via a scale. In this process, research questions were examined in the first stage by interviewing the experts to evaluate the structure, content, and application validity of the questionnaire; in the next stage, the statistical analysis method was found suitable to test these questions and the data collection tool (DCT) by the means of the scales that were previously applied in Turkey and ensured their validity and reliability.

In the research, the reliability analysis (the Construct Validity by Using Consistency Criteria) was rechecked to see if the reliability of the factors in itself was appropriate. In this context, the Squared Multiple Correlation and Corrected Item Total Correlation values were also examined. The research was based on a value of 0.30 for both values and sub-values.

To check the validity of the scales, the item analyses were firstly performed and Cronbach alpha reliability coefficients were examined during the testing of the structural validity. In the factor analysis, the Varimax rotation method was used because it made the variables loaded on one factor more pronounced and minimized the correlation of one factor with other factors. The value of 0.30 was based on examining the statistics on common variances (communalities) in the research, The items loaded with values related to the factor load below 0.30 have been eliminated. This has shown that the items contribute significantly to measuring the dimensions they are related to.

It was also evaluated that the scales used had the content validity of the data collection tool by the researcher and a faculty member with expertise in education management because explanatory factor analysis (EFA) and confirmatory factor analysis (CFA) were carried out by researchers who developed the scale or adapted it to Turkish, their validity and reliability were tested, and did not encounter any problems with their content and clarity.

<u>The Learning Organization Dimensions Survey (LODS)</u>

The LODS used in this research was compiled from the adaptation that is made by Yang et al. (2004) of the "Dimensions of the Learning Organization Questionnaire (DLOQ)" which is used in the researches of Marsick and Watkins (2003) and Yang (2004). There are 21 items created to measure the dimensions of learning at the individual level, the team level, and the organizational level, in scale. The reliability and validity analysis of the scale was carried out by Marsick and Watkins (1997) ($\alpha = 0.83$ to 0.91) and was used in many types of research in different sectors across Turkey.

It was reported that the results of the confirmatory factor analysis of the specified scale were acceptable ($\alpha = 0.95$) by using a study conducted in Korea by Song et al. (2009). However, according to the results of the confirmatory factor

analysis of the scale used by Avcı and Kucukusta (2009) in the tourism sector, the compliance values were found to be acceptable (α = 0.934). In their research, Basım et al. (2007) found the reliability values of the scale dimensions between α= 0.84 to 0.92.

The scale which was prepared in 5 Likert types in the previous studies in Turkey, was used with a Likert type rating of 5 in this research. The expression in the rating is "1= I strongly disagree", "2= I do not agree", "3= I am undecided", "4= I agree" and "5= I completely agree".

The Organizational Support Scale (OSC)

To determine the perceptions of the organizational support of the administrators and teachers, the OSC developed by Eisenberger et al. (1986) and adapted to Turkish by Akın (2008) is used. The reliability, descriptive factor analysis, and validity tests of the measuring instrument are done by Eisenberger et al. (1986) and the internal coefficient of consistency (Cronbach Alpha) was calculated as α=0.97. This value indicates that the measuring instrument has a high degree of reliability.

The OSC is a 36-point measuring tool consisting of a single dimension. However, this measuring tool can also be used in the form of a 16-point short form selected from the items on the scale by researchers who developed the scale. In this research, its short form was used. The measuring tool has a 7-type Likert rating of 1 (I disagree at all), 2 (I disagree), 3 (I usually disagree), 4 (I am undecided), 5 (I usually agree), 6 (I agree), and 7 (I totally agree).

The Communication Skills Inventory (CSI)

The communication skills of administrators and teachers were measured on a three-dimensional scale of 45 items developed by Ersanlı and Balcı (1998). Each of the cognitive (mental), emotional and behavioural communication skills on the scale contains 15 items. The intrinsic consistency coefficient of the original scale is α= 0.720.

By the 5 Likert Evaluation Scale for the average scores and rating when interpreting the analyses obtained from the measuring instrument in the research 1 is interpreted as "Never", 2 "Rarely", 3 "Sometimes", 4 "Often" and 5 "Always".

The Job Satisfaction Scale (JSS)

The Minnesota Satisfaction Scale (Minnesota Satisfaction Questionnaire-MSQ) which is used to determine the perceptions of the job satisfaction of administrators and teachers was first translated into Turkish by Gökçora and Gökçora (1985; as cited in Akdoğan 2002). The reliability, descriptive factor analysis, and validity tests of the measuring instrument were conducted by Weiss, Dawis, England, and Lofquist in 1967. The internal coefficient of the consistency of the scale (Cronbach Alpha) was found to be α = 0.869 in Akdoğan's study. This value indicates that the measuring tool is highly reliable and can be used for the research. The explanation of the concepts of intrinsic and extrinsic satisfaction here is based on Herzberg's Binary Factor Theory, one of the most important theories developed on job satisfaction.

The JSS is a 20-point measurement tool consisting of two sub-dimensions, intrinsic factors, and extrinsic factors. From the sum of the scores obtained from these two factors, the job satisfaction score is reached (Weiss et al. 1967, Vocational Psychology Research Center 2007). The JSS has a 5-type Likert rating of 1 (I am not satisfied at all), 2 (I am not satisfied), 3 (I am undecided), 4 (I am satisfied), and 5 (I am very satisfied).

All statistical analyses carried out in the research were realized with 0.95 reliability. The findings obtained as a result of the analysis were interpreted by converting them into Tables for the research and the questions it seeks answers to. In the research, the analysis (descriptive statistical results) obtained from all four measurement instruments were interpreted and the class range method was used by the Likert rating scale for the average scores and rating. After the data collection tool was implemented and collected, all analyses were carried out on the number of 300 data collection tools considered valid. The research includes the responses of the administrators and teachers to the items on the scale within the scope of the basic descriptive analyses. When analyzing the data collected for purposes of the research, the SPSS statistics program is used.

The Validity and Reliability of the Scale

In this experimentation, Cronbach Alpha values are used for reliability, the corrected item-total correlations are analyzed, and the distinctiveness of each item is examined by estimating the results of the research. During the analysis, the research questions are examined in the first stage by interviewing the experts to evaluate the structure, content, and application validity of the questionnaire; similarly, the statistical analysis method and data collecting tool suitable for the method are found to test these questions, in the next stage. Due to the reception of the expert's opinions and recommendations in the subject field regarding the scale items and the lack of any problems with the content and comprehensibility of the scale, it has been evaluated that the measuring instruments have content validity.

The research was started with the reliability analysis (Construct Validityby Using Consistency Criteria). The Cronbach-Alpha coefficients were calculated when applying the reliability analysis. This analysis was applied to test the reliability of the factors within themselves. In the next stage, the squared multiple correlations and the correlation of the corrected item totals were also examined. In the research, the sub-values were based on 0.30 for both values and the inappropriate items were deleted.

Subsequently, the Varimax rotational factor analysis was performed, the statistics on the variances (communalities) were examined, the inappropriate items were deleted, the scales were finalized and the reliability analysis was repeated. The internal coefficient of the consistency of the Learning Organization Dimensions Survey (LODS) was calculated as α = 0.930, the Organizational Support Scale (OSC) as α = 0.910, the Communication Skills Inventory (CSI) as α = 0.900, and the internal coefficient of the consistency of the items measuring the Job Satisfaction Scale (JSS) was calculated as α = 0.0840.

As a result of the evaluations done within this scope, below are the factor structures obtained for each scale and the Cronbach-Alpha internal coefficients of the consistency. As a result of the Varimax rotational factor analysis, it was observed that three factors appeared in the relation to the Learning Organization Dimensions Survey (LODS). The first factor consists of four items, the second factor consists of two items and the third factor consists of seven items. When the factor matrices related to the LODS resulting from the rotation process are examined, the variables and factor loads in the factors are given in Table 2.

Table 2. *Learning Organization Dimensions Survey and Factor Loads*

Factors	**Related Values**	**Factor Loads**	**Factor Loads**	**Factor Loads**
Factor 1: Individual Level	lo1	0.784		
	lo 4	0.866		
	lo 5	0.764		
	lo 6	0.731		
Total variance explained: 23.554%; Initial Eigenvalue: 1.508				
Factor 2: Learning as Team	lo 7		0.809	
	lo 8		0.845	
Total variance explained: 14.347%; Initial Eigenvalue: 0.894				
Factor 3: Organizational Level	lo 10			0.654
	lo 12			0.709
	lo 15			0.727
	lo 16			0.775
	lo 18			0.806
	lo 19			0.867
	lo 23			0.819

Total variance explained: 35.356%; Initial Eigenvalue: 7.121

The Organizational Support Scale (OSC) is evaluated with 14 articles under one factor. When the factor matrice related to the OSC resulting from the rotation process is examined, the variable and factor loads in the factor are given in Table 3.

As a result of the Varimax rotational factor analysis, it was observed that two factors appeared in relation to the Communication Skills Inventory (CSI). The first factor consists of 11 items, the second factor consists of six items. When the factor matrices related to the CSI resulting from the rotation process are examined, the variables and factor loads in the factors are given in Table 4.

Table 3. *Organizational Support and Factor Loads*

Factors	Related Values	Factor Loads
Factor 1: Organizational Support	os 1	0.670
	os 2	0.610
	os 3	0.769
	os 5	0.755
	os 6	0.758
	os 7	0.657
	os 8	0.629
	os 9	0.752
	os 10	0.656
	os 11	0.553
	os 12	0.735
	os 13	0.719
	os 14	0.677
	os 15	0.629

Total variance explained: 47.116%; Initial Eigenvalue: 6.596

Table 4. *Communication Skills and Factor Loads*

Factors	Related Values	Factor Loads	Factor Loads
Factor 1: Cognitive-Emotional Communication	cs 1	0.749	
	cs 2	0.712	
	cs 6	0.823	
	cs 7	0.859	
	cs 11	-0.647	
	cs 12	0.748	
	cs 17	0.870	
	cs 18	0.714	
	cs 20	838	
	cs 21	751	
	cs 22	0.818	
Total variance explained: 45.195%; Initial Eigenvalue: 11.214			
Factor 2: Behavioral Communication	cs 32		-0.822
	cs 36		0.814
	cs 37		-0.588
	cs 38		0.735
	cs 40		0.831
	cs 44		0.763

Total variance explained: 29.993%; Initial Eigenvalue: 1.568

As a result of the Varimax rotational factor analysis, it was observed that two factors appeared in relation to the Job Satisfaction Scale (JSS). The first factor consists of seven items, the second factor consists of three items. When the factor matrices related to the JSS resulting from the rotation process are examined, the variables and factor loads in the factors are given in Table 5.

Table 5. *Job Satisfaction and Factor Loads*

Factors	Related Values	Factor Loads	Factor Loads
Factor 1: Intrinsic Satisfaction	js 1	0.503	
	js 3	0.563	
	js 4	0.607	
	js 7	0.445	
	js 9	0.747	
	js 10	0.748	
	js 11	0.714	
Total variance explained: 28.458%; Initial Eigenvalue: 4.151			
Factor 2: Extrinsic Satisfaction	js 15		0.796
	js 17		0.773
	js 19		0.763

Total variance explained: 25.132%: Initial Eigenvalue: 1.208

Results and Discussion

In the first phase of the research, learning organization practices, organizational support, communication skills, job satisfaction perceptions of the administrators and teachers in schools, and the sub-dimensions of these variables are examined. According to the results in Table 6, learning organization practices were evaluated as "I agree" (M = 3.434; S = 0.730), the organizational support as "I usually agree" (M = 5.241; S = 1.016), the communication skills "Sometimes" (M = 3.297; S = 0.754), and the job satisfaction perceptions "I am satisfied" (M = 4.025; S = 0.563). It has been observed that the most perceived practice relates to the intrinsic job satisfaction of the job satisfaction "I am satisfied" (M = 4.157; S = 0.560).

Table 6. *Scores for the Practices of Variables*

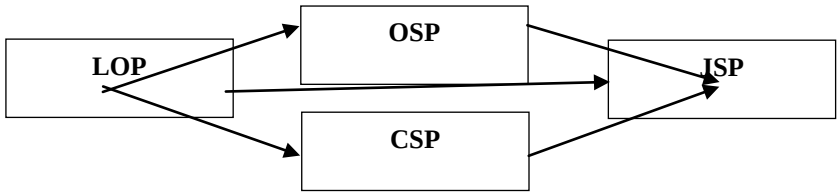
Varıables	*N*	*M*	*S*
Learning Organization Practices	**300**	**3.434**	**0.730**
Individual Level Learning		3.594	0.799
Learning as Team		3.540	0.826
Organizational Level Learning		3.311	0.860
Organizational Support Perceptions		**5.241**	**1.016**
Communication Skills Perceptions		**3.297**	**0.754**
Cognitive-Emotional Communication		3.105	0.911
Behavioral Communication		3.650	0.604
Job Satisfaction Perceptions		**4.025**	**0.563**
Intrinsic Satisfaction		4.157	0.560
Extrinsic Satisfaction		3.540	0.826

This result is similar to those of other researchers, like Adonisi (2003), Akdoğan (2002), Billings et al. (2003), Eren (2000), and Feinstein and Vondrasek (2007). According to the results obtained, it can be seen that the perceptions of job satisfaction are perceived at a higher level by administrators and teachers. The ability of the administrators and teachers to use their skills more than the factors evaluated, or to attach importance to values such effectiveness, success, authority,

independence, moral values, responsibility, security, creativity, providing a social status, i.e., intrinsic factors, shows that they love their job, they are provided with the necessary satisfaction from their job and still respect ethical values.

In the second phase of the research, it was investigated whether there was a meaningful relationship in the learning organizations between the practices and perceptions of the LO-JS, LO-OS, OS-JS, LO-CS, and CS-JS because learning organization practices (LOP) are determined as independent, the job satisfaction (JSP) dependent variables, and the organizational support practices (OSP) and the communication skills practices (CSP) as mediating variables, in the model being investigated. The model of the research created in this context is shown in Figure 1.

Figure 1. *Research Model*



The One-Sample Kolmogorov-Smirnov normal distribution test was performed to determine the level and direction of the perceptions related to the research variables in this sub-problem. However, the normal distribution of the variables has not been detected. In this context, the Spearman Analysis was used in the calculations because the perceptions of all variables investigated according to the results did not match the normal distribution test ($p<0.05$). Nonetheless, as a result of the Spearman simple correlation analysis, there was no significant correlation between the variables, the organization-level learning sub-dimension of the learning organization practices, and organizational support perceptions ($r = 0.129$, $p = 0.026$ and $p<0.05$) (See Table 7).

Table 7. *Spearman Analysis Relating Variables*

	VariableType		**LOP**	**CSP**	**OSP**	**JSP**
Spearman'srho	LOP	*r*	1.000	-0.002	0.097	-0.053
		p		0.968	0.094	0.356
	CSP	*r*	-0.002	1.000	-0.022	0.023
		p	0.968		0.707	692
	OSP	*r*	0.097	-0.022	1.000	0.022
		p	0.094	0.707		0.698
	JSP	*r*	-0.053	0.023	0.022	1.000
		p	0.356	0.692	0.698	

For the mediation test (the indirect effect of the independent variable on the dependent variable through the mediating variable) to be carried out, the correlational and regressive relationship between all variables and certain conditions must be maintained. These conditions which are called the steps of Baron and Kenny (1986, p. 1176), are listed as follows;

- The independent variable must affect the mediating variable.
- The independent variable must affect the dependent variable.
- When the mediating variable is included in the regression analysis in the second stage, a relationship must also occur between the independent variable and the dependent variable.

Since these conditions specified in the research could not be met, the mediation test could not be performed. In this case, it was evaluated that the mediation effect of the organizational support practices and the communication skills could not be mentioned between the learning organization practices and the perceptions of the job satisfaction of the administrators and teachers working in the schools where the research was carried out.

Conclusions and Suggestions for Future Study

In this section, the observations on the findings emerged as a result of the analysis of the data obtained by the data collection tool for the administrators and teachers working in schools. In sub-problems, the findings regarding the perceptions of the learning organizations, the organizational support, communication skills, and job satisfaction were interpreted in line with the perceptions of administrators and teachers. Subsequently, the failure to determine the mediating effect of the organizational support and communication skills on job satisfaction in the learning organizations were evaluated in line with the perceptions of the administrators and teachers of the bilateral relations between the organizational support, communication skills, and the level of job satisfaction, taking into account all the findings.

In this research, the obtained results in relation to job satisfaction support other achieved research findings in this field. For example, in many studies, the perceptions of job satisfaction are classified according to the obtained values and the order of importance, and first of all, the extrinsic job satisfaction perceptions are explained following the intrinsic job satisfaction. It can be said that intrinsic job satisfaction is an important and positive form of perception, especially for schools. It can be evaluated that the administrators and teachers who perceive intrinsic satisfaction more will also have positive feelings towards their schools, administrators, and colleagues. As Hughes (2006) points out, one of the best ways to make education strong is to improve the job satisfaction of the trainers.

According to the research, neither administrators nor teachers adequately perceived the organizational support provided to them and the communication in their working environment. It should not be incensed that these variables which are the basic elements of the learning organization, in particular, lead to many organizational behavioral deficiencies. This deficiency is already manifested in correlational relations.

The administrators and teachers in the learning organizations have high expectations both for themselves and for their institutions due to the equipment they have. Failure to meet these expectations causes dissatisfaction. At the same

time, the high knowledge and skills of the administrators and teachers in the learning organizations require that the managers should be more knowledgeable and qualified than teachers. If the administrators and teachers do not feel this, they will also consider the organizational support provided as inadequate.

The learning organizations are expected to have high communication skills due to their nature. However, excessive self-esteem and the drive to feel valued can give rise to a feeling of superiority between administrators and teachers. This can lead to communication problems. The results of the research also show that the least considered variable is communication skills. Organizational support is also not very appraised by administrators and teachers. This will affect the communication of employees who do not provide enough support because this motive is very important in the work environment. The communication of employees who cannot feel the necessary perception will only be as much as the work needs.

The concept of communication skills is also extremely important as far as job satisfaction is concerned. In cases where communication is inadequate, especially intrinsic satisfaction will be inadequate. This research proves that the communication problems are reflected in job satisfaction and, as it was proven, administrators and teachers could not perceive their communication skills adequately.

In the conducted research, it has been revealed that the concepts of organizational trust and organizational support are also important in raising the organizational commitment of managers and teachers. In addition, it is seen that organizational support perceptions are more effective in educational institutions. Considering that organizational support, communication skills, and job satisfaction are a hair's leg, in-service training programs should be used if necessary to further develop organizational learning practices.

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Empire, Hegemony, Hyperpower?

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Empire and Hegemony are among the crucial notions of science of international relations. Many scholars were investigating those concepts, and attempted to define them and estimate whether they retain explanatory value in contemporary situations of accelerated evolution of international system. Within the system governed by anarchy, those two prepositions were considered partial resolution to destructive tendencies generated within the international environment. Albeit those resolutions, it seems similar, their application required different conditions in order to become effective. Every mentioned above system is a complex and adequate answer to challenge posed by different set of features and variables generated by particular iteration of international system. The question remains: preconditions to occurrence of which system will be generated by late-Westphalian and subsequent generation of international environment? Contemporary iteration projects many individual characteristics, with regard to complexity, globalization and historical acceleration. One of the possible solutions to this issue is the recently introduced concept of Hyperpower, which could be positioned as a system in between those mentioned above. However its creation embraces new quality of international relations not yet encountered during course of history. This paper will be dedicated to the investigation of this concept and its usefulness for scientific analysis of contemporary international relations. Hyperpower embraces geopolitics and transnational in equal measures. It is product of a so-called "virtualization of state" and encompasses tools for effective interaction in both spheres of international environment. It is a generally much more passive system than mentioned above. Its activation consumes astounding amount of resources. Therefore, its primary application is in most cases passive, strictly limited to the shaping of the perception of remaining elements of international system.

Keywords: *Hyperpower, Hegemony, Empire, late-Westphalian international environment*

Introduction

One of the fundamental tenets of the Westphalian international environment is the notion of sovereignty (Pietraś 2008, pp. 57–74, Kondrakiewicz 2008, pp. 249–271, Panas 2014, pp. 51–68). It is still unclear its exact definition, but the entirety of the academic community associated with international relations agree that it is inseparably connected with statehood, thus each international actor is equipped in similar quantity and quality of this asset. However, as it was proven since the beginning of the 20th century, nation states tend to differ when it comes to their place and role within the framework. The differences between the size and modes of operations within the community of nation states drive the development of a

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third debate on international relations, between the neorealists and neoliberals (Nye 1988, pp. 235–251). Although both sides were basing their argument on a different assumption, the role of the surrounding environment was understood as the dominant factor which shape and form internal structures and its functions.

Therefore different strata of nation states were identified and examined. However, the main research objective of this paper is the investigation of the top stratum of the actors, mostly derived from the nation states category. During history, in most cases a stratum was occupied by a singular entity, which was labeled differently: either "Empire" or "Hegemony". The next question is aimed at the identification of differences between those terms, supplemented with the clarification of conditions which promotes coalescence and development of certain forms of a political entity overarching an entire international system. The final question will be in addressing the future of this structure: whether the future, post-Westphalian international environment will require a similar institution.

One of the possibilities only recently developed is the concept of a "Hyperpower". At first glance it strongly resembles the notion of a superpower, relating mainly to a specific category of the extremely potent state (Fox, 1944). However, this idea defines a new quality of international environment, introducing a different set of constructs and fulfilling a different set of functions rather than classical, Westphalian international institutions. The analysis will focus on three variables: national component, transnational component and functions. First, it is the role of the national component, which is the nation-state, one of the most potent examples of category of superpower or world power. Nowadays, the role of the center of a Hyperpower is strongly gripped by the United States of America. Second, it is the role of the transnational component in the form of a network of transnational connections between the Hyperpower's center and other elements of the international environment. Third, it is also the function of the Hyperpower in the international environment, as well as its role and contribution to the transformation of the Westphalian international environment into the next-generation international environment.

Two research hypotheses will be subjected to verification. The first will refer to the nature of a Hyperpower, which in its structure includes the construction of a complete balance between the tools of shaping international geopolitical reality and shaping transnational social reality. The second relates to the basic mechanism of the functioning of the Hyperpower in the international reality. Unlike the previous forms, it is clearly passive, shaping the perception of other participants in international relations rather than actively formatting actual international relations. To supplement those hypotheses will be the determination of whether any of mentioned entities will be attractive enough to be recreated within the framework of the post-Westphalian international environment. This assessment will be based on the scenario method, as their need to be based on relatively low level of certainty.

The structure of paper will be composed of four, connected parts. The first part will embrace the nature of the evolution of the international relations system which could be labeled as late-Westphalian. Particularly important will be issues of continuity and change, which are recreating and reforming paths for the future

development and modifying probabilities of future recreation of known forms of the international system central hub. The second part will be dedicated to the first period of development of International Relations, when is the highest authority in the global environment that was labeled as an "Empire". This node was based on two-layered foundations: overwhelming military advantage over remaining international actors. The second is universal and not questioned for its legitimacy as an Empire. The title may be confusing as it was used several times during history, with varied composition, which in turned disrupted clear definitions. The third part will embrace the second period of development of international relations, when the highest authority was labeled as a "Hegemony". This concept was created within the situation where it is not possible to acquire military superiority over remaining elements of the system, but the mantle of Hegemony is achieved only by a set of skills and capabilities. Those who excel among rivals will be granted this post. In other words, this place is given temporarily and conditionality, and an actor which starts to decay as a wielder of Hegemony, will be tested and eventually replaced in a contest known as a *Hegemonic War* (Gilpin 1988, pp. 591–613). The last part will be dedicated to defining and analyzing the concept of Hyperpower, which according to assumptions pointed out in this paper, will replace both above mentioned forms as a central hub for the international system. In this part of the structure, the particularity and functions of a Hyperpower will be discussed. The paper will be summarized with a few remarks invested in the future prospects for Hyperpower developent.

International Environment: Change and Continuity

Since the last decade of the 20th century, international relations scholars have been engaged in debates concerning the growing urgency of redefinition of the scope, structures and functions of the international environment. This situation was created mainly thanks to changes occurring within the deep undercurrents of civilization – so called megatrends (Balcerowicz 2002, pp. 85–118).[4] Observed changes embrace transition from the classical form of the international environment known as Westphalian (Gross 1948, pp. 20–41), existing since 1648. The predominant feature is dualism, present in every aspect of social relations, such as between national and international laws (Beaulac 2004, pp. 181–213). As the next generation of the international environment is taking shape, this dualism is slowly modified to the point where both orders will overlap and interpenetrate themselves. A manifestation of this phenomenon may be the emergence of numerous, ephemeral forms of political and social organizations functioning at the intersection of both spheres. The rea of

[4]The term was introduced to science of international relations by John Naisbitt. Currently, it is used to describe universal tendencies that shape the international order at the highest social level (civilization). Different researchers identify and name different megatrends: J. Naisbitt distinguishes 10 of them, P. Kennedy - 7, National Defense Council report (Global Trends 2015) - 7, H. McRae - 5; M. Perczyński - 4, and J. Pajestka - 2. On the other hand, B. Balcerowicz distinguished 6 megatrends: globalization, IT revolution, uneven demographic explosion, threats to the natural environment, systemic transformation - in the economic (capitalism) and political (democratization) domains - and also the clash of civilizations.

activity of those actors – both formal and semi-formal – will be a number of mechanisms, legal, political and social, enabling external interference in the national constitutional order (European Parliament, 2020).

The classical Westphalian international environment is fixed on three basic foundations. First and foremost is in the structure of the international community stemming from the nation state, as a single actor (Giddens 1986, pp. 216–220), a category with undisputed power in two important dimensions. One is the undisputed supremacy within the geopolitical sphere of international relations, represented by skillful and effective application of military assets. In fact, some commentators claim that a nation state is an army framed with the government.[5] It was used directly in the Kingdom of Prussia in the 18th century, but it could be extended toward all nation states. Representatives of this category, whenever it was recognized by others, is known predominantly for its force of arms. The other is social legitimacy, basing not only on rational and political association, but also emotional investments in forming bonds between the nation and individual citizens. This process was greatly improved by the French Revolution, especially due to surging demands for manpower (Forrest 2003, pp. 8–32). In consequence, connecting the military power with social legitimacy created the cornerstone for international relations, from which other forms of international community stem: non-governmental organizations, multinational corporations and international organizations. However, their existence and well-being was completely dependent on the collective will of the nation-state.

The second issue is the split within the global entity due to the omnipotence of a nation-state, which could be described as a dichotomy between what is within the borders of a nation-state and what is beyond them (Cerny 2010, pp. 64–84). Former space is associated with pacification, order, hierarchy and non-violent modes of communication. The latter on the other hand is associated with chaos, disorder, anarchy, and modes of communication supplemented with violence, in the form of wars and coercion. Between those spheres, there is a national border, sealed and protected, and carefully designed and constantly watched by government agencies located on both sides. At the peak of the Westphalian international environment, people, goods and information were carefully examined and permitted by issuing various documents to access internal, national space. However, this permission was quite frequently limited or canceled entirely (Shaw 2011, pp. 331–348).

The third issue is that the institutions are responsible for managing and maintaining cohesion of the whole system. Those are, embracing various sets of mechanisms, stretching from international law to the concert of powers. The most important of those is the balance of power, which could be understood as an internal mechanism which requires every rise of certain nations to be countered by other entities or coalitions of them (Sheehan, 1996). It was particularly visible during the Napoleonic Wars, when a sudden rise is the prominence of the French Empire triggered the creation of seven coalitions, which eventually arrested this ascendancy and dispersed this excess of power between remaining actors of the European international subsystem. What those institutions have in common is the fact that they are constructed according to three important principles. First and foremost,

[5]"Where some states have an army, the Prussian Army has a state" quote attributed to Voltaire.

they are dedicated only to support relations between nation-states. At the core of every institution lies a presumption that establishing fully-developed intrastate relations is extremely burdensome, especially when it comes to mutual distrust and cultural differences. Therefore, they were responsible for tackling those obstacles; for instance, with application of diplomacy (Berridge 2015). Second, despite limiting role of violence within their framework, violence in itself was also considered to be a viable institution for the international system, particularly in the form of war, at least until 1945, when it was eventually banned (United Nations n.d., article 2.4). Third, despite the beneficial impact on national performance, there is no compulsion to participate within them. The sovereignty, the ultimate right of any nation-state to participate in any form of international cooperation, was the most important principle— it allowed the nation state to opt-out of every initiative that defied their objectives.

This construction has slowly evolved since the second half of the 20th century. The primary driver of this change was the complex network of the above-mentioned civilizational megatrends. In this particular perspective, two separate megatrends could be identified: demographics and technology. Formerly rough shapes of the quantitative parameters of International Environment, they primarily depend on the number of people present within the system. The latter are designs of the qualitative parameters of the international environment. Both of them are to some extent intertwined, like in the issue of literacy (UIS Data Centre 2015), which assess the capacity of individuals and social groups to efficiently operate contemporary technology. When it comes to change and continuity, which stirred the debate about the need to redesign international relations, there could be observed three fundamental changes which are being unfolded within the human civilization, stemming from changes within those megatrends. First and foremost is the reversal of demographic explosion (United Nations Population Division Department of Economic and Social Affairs, 2015). This means that an influx of new society members is getting severely limited. In the case of developed nations, it is limited only to immigration, which could be, in time, limited by spread of this effect to the entire world. The main consequence is developing sensitivity of nation states to loss, especially connected with battle casualties and collateral damages. Second, is the societal diversification on the scale of globe and on a scale of individual nations. This phenomenon occurred because of *national awakening* identified and is described by Brzeziński (2012), which is focused primarily on the activity of national and sub-national entities within the framework of international relations. This in turn makes mobilization of national assets much more difficult and challenging. The third factor is a drastic rise in accessibility of advanced technologies of data processing and communication, not only among various national agencies, but also within the societies and individuals (Cooper 2008). This means that in the geopolitical social space, dominated by nation states, is supplemented with transnational social space (Pietraś 2013, pp. 93–113), which empowers non-state entities which became equal to nation states, at least to an extent.

Those changes are causing and accelerating the deterioration of institutions of the Westphalian international environment. The question is, what will replace

them? This paper limits the scope of its investigation only toward possible paths of evolution of the central hub of international relations, which stems between the Pre-Westphalian concept of Empire and the Westphalian concept of Hegemony. However, due to the uniqueness of the constantly designed and constructed international environment and in order is to offer possible solution of new quality, features associated with both notions will be combined – that is, Hyperpower.

Pre-Westphalian: Empire: Law and Military

Chronologically, first in those concepts is the concept of a central hub for international relations within an Empire. However, that is cause for a challenge, because it was used for some many cases within the framework of history and political sciences, thus the term has become distorted and, to some extent, biased. Therefore, before there could be a full analysis of the term, there is a need to clarify the definitions. First of all, it needs to be made clear that during the history of political institutions, an "empire" was used frequently to describe various political entities. Stretching from the Summer and Assyrian Empire, through Roman, Chinese and Byzantine Empires, the Aztec and Inca Empires, Indian Empire, British, French, Spanish or Russian Empires to recently, the investigated idea of the American Empire. One important feature must be stated: empire is used in at least three separate meanings.

First of those is the understanding of an Empire as a particularly strong entity of political nature and expansive tendencies.[6] It may be observed primarily in the opening phases of the pre-Westphalian international environment when proto-political entities were longing for more assets and prestige. However, lack of management skills and uniquely recognized procedures usually prevented the establishment of more coherent entities. Most visible and known could be Persian Empire, Athenian Empire[7] or Empire of Alexander the Great.

The second way to explain the term is through the application of the socioeconomic context of the 19th century, when developed economies of Western Europe sought new markets and resources to feed industrial and military complex which they found in colonies. This issue was particularly interesting for followers of the Marxism theory of international relations (Czaputowicz 2008, pp. 140–176). Within this subcategory, we can identify colonial empires of Great Britain (both of them),[8] France, Netherlands, Spain and Portugal.

The third possible application of Empire is in cultural or universal terms. This entity was applied only twice in history. One of those examples was the Roman Empire, which existed between 27 BC and 476 AD (Diamond 2011, pp. 12–13) and the Chinese Empire, which existed between 2070 BC and 1911 AD (Li 2002, pp. 321–333). Only this strand of Empires will be subjected to analysis within this

[6]The greatest of them was Persian Empire ruled by Achamenid Dynasty.

[7]Officially labeled as a Delian League. This organization was closest to transformation into unified Actor between 454–404 BC.

[8]First British Colonial Empire (1707–1783) was focused on North America. Second British Colonial Empire (1783–1945) was constructed in Asia and Africa.

paper, mainly because only those entities were functioning as a central hub for international system.

Both entities, despite few obvious differences, display three identical features when it comes to their internal mechanisms. First and foremost it is that they encompass the whole known world. Beyond their limits lies only territories deemed not worth of conquering. In most cases the imperial borders were leaning on barren and inhospitable lands, with only scarce human settlements, devoid of serious political structures. In most cases, those people were called barbarians, which is a term designated to determined lower social and cultural status when compared to imperial subjects. But the primary designate of Empire is that it politically embraces the whole international system, and does not leave any significant entity beyond its framework. This is also a distinction from Aztec and Inca Empires of Latin America. Since their establishment and constitution as a dominant political faction in their respective International Relations Systems was coupled with the arrival of expeditions from Europe. This meant that, albeit fragile and distant, a connection was coined to the region of space beyond their military reach; Thus conquering the whole known world became purely impossible, and the influence of a newly-discovered part of the globe became their undoing (Leon 1998).

The second feature is closely connected with the former one. It is the fact that a universal Empire has at its disposal overwhelming military advantages over remaining political elements in the international environment. However, despite obvious connotations, those capabilities are not associated with skills and technologies, but – what could be seen in history of Chinese Empire – associated with the capacity to recreate military capabilities, suffering even catastrophic damages in quantitative and qualitative dimensions (all the while still being able to conduct military operations). These elements lie at the foundation for imperial success in the pre-Westphalian international environment. The armed forces of the pre-Westphalian Empire were makers of a long line of triumphs and victories, defeating every enemy within, as well as without. In fact, in too many cases, the application of a military force was the primary and sole response of an imperial government. Even defeat on a battlefield, as happened to Rome in Teutoburg Forest in 9 AD (Seidman 2014, pp. 94–114) or Mongol conquest of China in 1279 AD (Dardess 1978, pp. 6–11), which were particularly humiliating, did not deplete Empires of their resources, allowing them to resume daily operations within a considerable schedule.

The third feature of an Empire is its legitimacy. It was recognized by every entity within its framework as a value in itself, not only entitled to undertake certain activities (even against national interests of them), but also as a beneficial factor which needs to be supported in existence. This legitimacy was clearly visible in the years after its collapse in continuous attempts to revive it in some form and shape. The primarily factor of legitimacy is the acceptance of structures and mechanisms of imperial provenience, particularly those engaged in developing a communication network (postal institutions, universal language) (Ramsay 1925, pp. 60–74), and law: the internal and international and institutions responsible for conflict management and prevention (Rajak 1981, pp. 65–81). What is particularly evident is the level of integration that both of these Empires enabled application of physical violence, in most cases in a form of armed forces incursions, such as quelling the rebellions.

The notion of Empire was so popular that that idea of reviving an Empire shined throughout history. It was undertaken in every historical epoch, mainly in Europe, but recently also on other continents, such as Latin America.[9] However, none of them were successful, mainly due to the reasons which will be mentioned in next paragraph. What needs to be addressed in this place is the chance of successful reintroduction of Empire to post-Westphalian international environment, especially, that from time to time scholars tend to associate the term Empire with particular nation states, such as the United States (Lundestad 1986, pp. 263–277). However, the direct recreation of a classical Empire, even in a refurbished state, is hardly likely. It is due to three features of contemporary international relations. First of all, there is very little probability of creating such overwhelming military advantage, as is necessary to the existence of a proper Empire, particularly in a dimension of vulnerability of losses (Rohn 2016). In fact, classical Empires were able to recreate themselves on a brink of complete collapse, regaining operational capabilities within a brief period of time.[10] In the case of the United States, there could be observed a developed vulnerability to losses, as well as within their own manpower[11] as collateral damage to the opposition forces (Robinson 2006) and civilian casualties. A vulnerability which could cause complete change of national objectives and abandoning whole swaths of space of particular value to this nation state. Second, the classical imperial structure of government does not possess an analytical capacity suited to manage contemporary issues, which are much more diversified in any imaginable dimension and much more turmoil, especially when it comes to slow but steady joining two spaces of policy: national and international, which creates new and ephemeral forms, which are created in droves only for short period of time. The complexity of the contemporary international environment is supplemented with growing transnational social space (Bilecen et al. 2015, pp. 244–256) which provides classical statehood capacities to smaller entities, even single individuals. The third feature is the collapse of legitimacy within the international environment. This was caused by the diversification and fracturing of existing international structures and a growing cacophony of voices and actions based on different and often contradicting cultures. Therefore, the possibility of unison acceptance and compliance with universal authority is insignificant.

Summarizing, Empires were a very potent and durable hub in the international environment. It was the longest existing though, inspiring constant attempts to reinstate some form of imperial rule. However none of them were successful. In the future, what could be projected in terms of changes within the international environment will not create conditions which should be more favorable to this kind of actor. Therefore this is not the construction which could be implemented.

[9]Empire of Brazil (1822–1889).

[10]It was particular evident during Punic War, when Rome between disaster in Battle of Cannae (216 BC) and decisive victory in Battle of Zama (202 BC). Complete recovery of military capabilities in 14 years.

[11]In Vietnam War United States deemed crippling losses at level of 58,281 military casualties and 303.644 wounded.

Westphalian: Hegemony: Functionality

The second construction which was designed and tested within the framework of the global international system was Hegemony. It was associated with the second generation of the international environment, which is labeled "Westphalian", and as well has at least two separate meanings. First, which is associated with the Chinese School of International Relations, and resembles the Empire in the manner of unifying brutal strength with cultural legitimacy. What differentiates it from Empire is totalitarianism of the term. Hegemony is entitled and encouraged to enact complete control over any social activity, and severely punishing any disobedience. Thus Hegemony resembles the Western notion of totalitarianism (Mosher, 2000). Articulation of this assumption was one of the primary concerns within the negotiations between the US and China in the 1970s (Yafeng, 2006). The second understanding of the notion stems from research conducted by George Modelski and his long cycle theory. In this context, Hegemony may be understood as a function of power distribution within the international system. In this case, Hegemony is a set of functions assigned to the actor which displayed the greatest potential and skill of application of those assets within the international relation. What was more important, in most cases, was acquiring the mantle of Hegemony heavily relied on innovation. For instance, in case of Great Britain, their supremacy relied on creating a credible and extremely effective financial system (Rutterford and Sotiropoulos 2016, pp. 919–945).

The Hegemony which will be analyzed within the framework of this paper is wrapped around the Modelski Concept. It is very different from the concept of an Empire, and among actors analyzed within this paper, it could even be seen as opposition to the Empire. It could be perceived within analyzing of particularly evident features of Hegemony. First and foremost the feature of Hegemony is that it is intricately temporary. It is designated even within the Modelski Theory, which embraces the idea of decay and collapse of Hegemony whenever distribution of power in international environment changes, mainly due to technological progress. Therefore Hegemony is in most cases elusive and limited attribute of nation state. In comparison, during the four centuries of the Roman Empire, there were at least five cycles of Hegemony, which benefitted four states recognized as Hegemony.[12] Accompanying the change is a *Hegemonic War*, which can be defined as a particular war embracing a significant portion of the international system, serving to achieve extended objectives, even aiming at an internal transfiguration of participants and was approaching the intensity described by ideal of *clausewitzean ideal war* (Gülboy 2015, pp. 7–22).

The second feature of Hegemony was a narrow margin of military supremacy. There is a need to underline that it was created within a system of geopolitical entities possessing similar capabilities to effectively resist external military pressures. Therefore, every edge that the Hegemony may possess was not as significant or permanent as an Empire was. Furthermore, the difference of power potential and resources were not significant, which meant that the resilience of Hegemony was

[12]According to George Modelski and David Kondratieff, those nations were: Portugal, Netherlands, United Kingdom (twice) and United States.

much less noticeable during the epoch of Empires. The more cooperative stance of operation was adopted. Hegemony very rarely decided to operate individually. Instead, its function was pronounced in igniting cooperative activities, for instance in a form of multilateral conferences or alliances. It was essential to acquire resources in order to boost Hegemony capacities in order to obtain a mutual goal. The best example is the series of anti-French coalitions formed in year between 1789–1815 and the Triple Entente (focused around Hegemony) and Triple Alliance (focused around contender) (Conybeare and Sandler 1990, pp. 1197–1206).

The third issue of Hegemony is that the only legitimacy it possessed was based on its efficiency. When an Empire was recognized legally as a central entity by remaining participants of the international system, Hegemony is recognized only because it is useful to remaining elements of the international system. Because of the diversification of the structure of actors means that meeting the expectations of all other nation states is extremely hard, if impossible. Without a military edge to quell discontent actors, means that there is significant minority of nation states that are discontent with Hegemony and its performance. Furthermore, this aggregation of contenders and dissidents is constantly fluctuating. For instance, during the Napoleonic Wars, France was the primary contender for Britain's Hegemony, whereas a hundred years later, its place was occupied by Germany. That means, Hegemony, contrary to Empire, was forced to manage rivals located within the system, not only on the peripheries.

The notion of Hegemony was characteristic to the Westphalian international environment, which originated in the European international subsystem. Not surprisingly, there were no non-European nation states which acquired this title. The last nation state bearing the mantle of Hegemony is the United States. The question arises whether it will be last in the line of Hegemonies, or whether it will be replaced by the next successor, for instance China (Roy 2020, pp. 101–117), after a protracted hegemonic war. This question is still open as it addresses prospects and forecasts into the future which is still to happen and being verified. However, expanding evolutionary tendencies of continuity and change labeled as late-Westphalian international environment, and drawn into the post-Westphalian international environment, there is need to mention that despite probability to repeat hegemonic cycle at least one more time are bigger than recreation of Empire, but are low enough to justify seeking for new kind of institution to replace Hegemony. There are three main reasons to justify this statement. First and foremost is a diversification and specialization of international actors, which limits in terms of quantity and quality of available resources. Despite absolute gain in terms of national capabilities, the sheer size and complexity of international relations, coupled with the drastic rise of costs of application of classical tools of power (limitation of available manpower to be the most important cause of this situation) meant that Hegemony will be more limited than it was in the past. The second feature is the rise of transnational social space, which requires a completely different set of capacities to operate and manage efficiently. With translating additional sectors of social activity, means that the managing of international relations will require serious redefinition of a managing hub. The third feature which limits the probability of resurgence of this kind of actors effectiveness is resurgence of non-European entities.

This means that unofficial community of interests and values shared by Europeans and a community of understanding of international systems is effectively broken. Therefore an internal complexity of a central hub need to be bolstered beyond capacity of singular actor.

Summarizing, Hegemony was very flexible, but a temporary central hub for the international environment. It was subjected to constant cycles of decay and renewal intersected with major crises labeled as the *Hegemonic War*. However this does not mean that this post was attractive enough for international actors to compete for its occupation. In the future, what could be projected in terms of changes within the international environment, will not create conditions which should be more favorable to this kind of actor. Therefore this will not be the construction which could be implemented.

Post-Westphalian: Hyperpower: Unification of Geopolitical and Transnational Space

Why this concept and not the others? Before further considerations, this question needs to be answered. With the advent of contemporary turbulent phases of international relations, there could be identified numerous concepts aiming at defining and explaining observed changes in structures and functions of the international system. Due to extended investigation, Hyperpower was chosen as a lead motive for this paper. There are three reasons to support these choices. First and foremost is that Hyperpower embraces elements of change and continuity, which reflects evolution of the contemporary international environment. On the one hand, there is clearly a visible resemblance to notion of superpower, which has been extensively exploited by scholars in the second half of the 20th century. On the other, change in prefixes indicates that this concept was refurbished and redesigned in order to suit contemporary needs. The second reason is the prefix "hyper-" which is commonly understood as a modifier of a greater magnitude than suggested by prefix "super-". Therefore, this suggests that previous ideas are developed and supplemented with new qualities in structures, capabilities and functions. Furthermore, a new, more potent prefix suggests amplification of capabilities of Hyperpower, compared to former generations, in terms of enhancing range of influence and quality of implementing those influences. And finally, the notion embraces also the noun "Power", which is commonly associated with the capacity to operate in an international system with the constant resistance of other elements of a system as well as a system itself. Therefore, Hyperpower could be understood as a next stage of evolution of international actors, equipped with new means of overcoming resistance while pursuing its own objectives.

Most scientists dealing with the issue of defining the term Hyperpower, emphasize two dimensions of the phenomenon. First, it is its quantitative nature. There is still debate in the scientific community as to whether the United States meets the requirements for holding this position in the international system (Kondrakiewicz 2015, pp. 219–241). Most of them are variables of quantitative nature, which are visible mainly in the economic and military spheres. Second, it is

also its role in international relations, which is derivative of functions fulfilled by the United States for the rest of the global community. There could be identified at least two opposing opinions. On the one hand, there is a statement made by Bacevich (2008), who sees the United States of America as a threat to stability and world peace. On the other extreme, the concepts of Salvatore Babones and George Friedmann can be pointed out, who emphasize the need to play the role of a global power in order to effectively protect national interests and a favorable balance of power in the international environment.

Most Western scholars seem to agree that Hyperpower is based on the conjunction of the three spheres of activity of the subject in the international environment. First, there are military capabilities.[13]Paradoxically, what distinguishes the military capabilities of the Hyperpower is not the extremely effective ability to use military force, but a sufficiently developed potential in this field that, even defeat on the battlefield, can contribute to the achievement of political goals set in the government's strategy. Second, it is also an economic position. In most cases, this dimension is understood as exercising political control over a significant segment of the global economy, most often expressed as a percentage of gross global production. However, as in the previous point, the economic dimension of Hyperpower is visible above all in qualitative participation in the world economy, and also by drawing on the so-called hegemonic rent,[14] i.e., additional income generated from managing the world economy.

Third, it is the realm of culture. The sphere of culture should be divided into two sub-spheres. The first relates to the legitimacy of a superpower as a norm-creating entity shaping the principles and mechanisms regulating international reality. The second is undoubtedly the cultural mimicry of the lifestyle of a Hyperpower society. This mimicry covers three basic ranges. Firstly, it is the sphere of values and philosophical and, to some extent, religious systems, which are internationalized into the international and transnational space, and thus recombined within individual political units, partially resembling them, but in most cases leading to grotesque effects. Secondly, it is the sphere of codes of higher culture, or rather the tools necessary for their effective reading. In the case of a Hyperpower, this knowledge is more widely distributed, which makes it possible to read and internalize the message on a much larger scale within the mimicry of lifestyle. Third, it is also a question of popular culture, related to issues such as fashion, entertainment and consumer behavior. It is an element of culture almost completely devoid of a national context, it is extremely easy to decode and mimicry, but in practice its reproduction is related to the perception of the source of mass culture.

In the context of considerations on the subject of Hyperpower, the key becomes the answer to the question about the nature of the subject corresponding

[13]The entire operation was carried out between January 17th and February 28th, 1991. Operation *Desert Storm* officially ended on November 30th, 1995.

[14]The concept is quite vague and defined differently by various scholars. In most cases hegemonic rent means additional profits obtained by exercising the function of a hegemony. Although in the scientific community there can be met various dimensions of the above rent, ranging from the political domination of the system, which means the possibility of initiation and implementation of complex political projects.

to the Hyperpower criterion, and more specifically with regard to the continuity of the internal category of the state. Paradoxically, it can be said that Hyperpower is a category that is located above the state and between Hegemony and Empire. As a result, it is deprived of a large part of mechanisms supporting expansion to the limits of the known world. On the other hand, its position and internal mechanisms distinguish a country belonging to this category from others, even the largest. In essence, the Hyperpower is the whole system in which the superpower is located, but it goes beyond its own borders and reaches almost every corner of the Earth, using formal and informal networks of transnational connections, supported by state and non-state participants in international relations. Unlike an Empire, which is able to operate in an active phase in an international environment, a Hyperpower is mostly a passive entity, the activation of which consumes enormous amounts of resources and, as a process, is rarely successful. In the case of the Hyperpower of the United States, its activation has happened twice in contemporary history. For the first time, during the United Nations' intervention during the war in Korea in 1950-1953 (Stueck 2002). The second time happened during the First Gulf War in 1990-1991, with dual operations: Desert Shield,[15] and Desert Storm (Tanner 2007, pp. 81–106).[16] Unlike a Hegemony, which is based on military and economic foundations based on recognition of those acts by other entities through acts of violence in an international system, Hyperpower relies on non-military features, such as international law, regimes, traditions and habits, but also intertwining epistemic networks of non-state entities, which according to basic assumptions of science on international relations are independent of state entities. Therefore, while Hegemony can be clearly distinguished from other entities present within the system, in the case of Hyperpower those lines are blurred and undefined. The best example maybe the very nuanced and complex Sino-American relation. On the one hand, The People's Republic of China is considered as a political and military rival to the United States, but due to extensive nature and structures of Hyperpower, is unable to pursue certain objectives, like full support for Russia in the 2022 invasion of Ukraine, due to consequences posed not only by the United States themselves, but also secondary elements of Hyperpower, with the normative power elements particularly.

[15]This operation was a response to the occupation of Kuwait by the Iraqi army (August 2nd-4th, 1991).

[16]Main difference between military operations conducted by Hegemony and Hyperpower, could be differentiated by three different elements. First of all, Hyperpower military operations are multinational by definition in order to be successful. Every time, even for United States, unilateral military operations are undertaken are economical and normative burden which overwhelms its capacities. For a state of lesser capacities, punishment could be destructive. Second of all, Hyperpower military operations contrary to Hegemony, embraces significant and equal civilian component. Features such as international law (UN Security Council resolutions), humanitarian affairs, appealing to public opinion and other forms, currently associated with hybrid warfare are equally important to achieve eventual success. And third of all, military operations are long term activities, which do not end with peace treaties. Crucial element is to construct political settlement which will reintegrate participants of this conflict in existing Hyperpower structures, even as challengers to its central hub. Failure to design this solution is the foundation of near constant turbulence. Summing up, Hegemony is focusing primarily on achieving contemporary compliance with its demands, while Hyperpower aims at restoring functionality of conflict-affected sectors for International System.

As a result, the existence of Hyperpower is made possible by carrying out complex and sophisticated political and military operations efficiently and effectively without overburdening the nation – a state located in the center of the Hyperpower. Despite this, in most of the remaining cases, the United States did not make efforts to mobilize a majority, if not every connection of this system, as was the case in pointed campaigns in Latin America, such as in Panama (Tanner 2007, pp. 41–60). Either their efforts ended in failure, a spectacular example of which was the Second Gulf War, started in 2003,[17] or they were unable to effectively use the accumulated potential, which was the case with the Vietnam War in 1955-1975 (Summers 1995, Rothgeb 1993). Thus, Hyperpower in most instances remains passive, as its activation requires additional portions of resources, skills of central government and reception of other actors of the international community.

The potential of a Hyperpower can be projected within the contemporary international environment in three major ways: sanction, coordination, and indoctrination. The first feature is typical of historical systems. It assumes the possibility of assessing the activity of other entities and taking action in the event of their inadmissibility in order to compel those entities to adapt a desired course of action. However, unlike the previous ones which were relying predominantly on plain and obvious coercion, the application of sanctions requires different strategies and tools, sometimes more subtle and less obvious. Hyperpower acts rather as a hemostat (Słownik Języka Polskiego PWN 1983),[18] concerned with the unending quest to balance a simultaneously deteriorating and developing system. In the context of the application of sanctions by a Hyperpower depends on the efficient functioning of the network of transnational connections, which are the bypassing classical tools available to a superpower.

The second level of power projection is the coordination of various activities and initiatives which take place within the contemporary international system. This is a derivative of the shift along the axis of authority that shapes the quantum field of the manifestation of power in the late-Westphalian international environment. As a result, the role of the central actor of the Hyperpower is changing. From a center that gives orders - and forces obedience - the Hyperpower becomes a center for harmonizing international activities and initiatives. This function arises from the theory of "benign hegemony" coined and developed by Catley (1997, pp. 377–399). In its context, arising from the theory of hegemony, the United States stands out from the historical powers with two features: gentleness and self-limitation (Kupchan 1998, p. 46), especially in the dimension of the use of means of violence. However, most analysts of the phenomenon point out that this feature of the United States appeared only in the last thirty years, marked by a high degree of pacification of the international environment (Kupchan 1998, p. 41).

[17]Despite designating the international forces occupying Iraq after 2003 as a coalition, it was disproportionately smaller and therefore more asymmetric than the corresponding coalition formed in 1990. The largest nations, apart from the United States, are Great Britain (second-tier power) as well as Poland and Spain (medium-sized nations).

[18]According to the dictionary a homeostat is: "a cybernetic machine constituting a system composed of a series of regulators imitating homeostasis". On the other hand, homeostasis is: "the ability of a living organism to maintain a relatively constant state of equilibrium, for example blood composition or temperature, through appropriate coordination and regulation of life processes".

The third feature of the Hyperpower system is the indoctrination of the subordinate participants of the system, which means virtually any other international actor. This mechanism is based predominantly on Ian Manners' idea of *Normative Power* (Manners 2002, pp. 235–258). According to the theory of Modelski and Thompson (1996), the Hegemony displays the possibility of binding norms and values of the entire global system towards its own national interests and perspectives. As the hegemonic system evolves into a Hyperpower, this capacity only gains importance and is consequently developed. This particular mechanism is related to the evolution of the environment and a thorough reconfiguration and expansion of the critical infrastructure network (The White House Office of the Press Secretary, 2013), which is the main soft power projection channel and is almost exclusively responsible for the application of sanctions and shaping the preferences of the normative power application. In the current configuration, it utilizes extensive channels of expressing respect and legitimacy, and is displayed in conjunction with a rather specific system of sanctions, primarily in the social dimension, with particular emphasis on the most effective of the entire range, i.e., name and shame, which assumes ridiculing the trespasser (Lenz 2013, pp. 214–215, Braithwaite and Drahos 2002, pp. 269–288).

Summarizing, Hyperpower is a relatively new and untested concept for a central hub in the international environment. It reflects the duality of the contemporary international system between geopolitical and transnational social spaces. But it is not as active as both mentioned above, therefore it will be more difficult to spot and analyze its activity. It will rather influence perception of other participants and create opportunities, rather than actively operating into international relations.

Conclusion

Summarizing the considerations about the nature of Hyperpower, it needs to be mentioned that this construction is derived from both former centers of the international system: Empire and Hegemony. This communion is supplemented and altered with changes stemming from changes within two civilization megatrends: demographic and technological. That means that Hyperpower is a new quality in international relations. However, what is important, is that the system presents two serious challenges for researchers. First, it is not completed, despite the fact that it was first constructed in 1945 – willingly and unwillingly. Its primary features are still fluent enough to be reconstructed. Other parts are being constantly added to framework offering new capabilities which must be analyzed, like Internet surveillance and big data analysis. Second, it is predominantly passive, especially compared to Empire and Hegemony, thus empirical data to analyze it is scarce. The research need to be done basing on indirect approach and diversified sources.

Having said that, the biggest novelty of Hyperpower is the fact that it is constructed with the capacity to operate within the geopolitical and transnational social spaces. Therefore, despite association with the United States, it is extending in every direction beyond its borders. It is constructed from various semi-

independent entities such as transnational corporations and non-governmental organizations, sharing objectives and responsibilities and supplementing their function in the international system. However, only rarely are they operating in unison to achieve clear and visible objectives. In most cases this system is shaping a perception of other members of the international community. These three basic functions are the main focus of the concept of Hyperpower: sanction, coordination and indoctrination. Despite their flaws, among three mentioned actors – Empire, Hegemony and Hyperpower – the latter is the most probable to manage the international system in the post-Westphalian iteration.

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