The Status of Gender and its Roles
in the Narrative of Actor-Network Theory:
Gender Bias Case Study in Gross Domestic Product

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Abstract: The article presents the concept of gender bias from the point of view of the possible interpretation of ontology and epistemology of Actor-Network Theory. Gender, related roles and algorithms, data and various kinds of distortions in the way of representing the world are endless systems of relations devoid of substantial properties. The example of the economic indicator of gross domestic product shows the evolution of the interrogation of its objectivity and, in particular, the imbalance, hidden in its assumptions, concerning the impact of people with different social roles related to gender on the interpretation and construction of the economy. The issue of gender bias was presented as a purely discursive and therefore a political problem. For the concept of 'objective social reality' is illusive in its nature; here, the ethical and moral responsibilities are mentioned, which are found in the act of creating new models and algorithms to shape the world and convince the masses about the 'real' universe of social relations.

Keywords: Actor-Network Theory, gender bias, ontology, gross domestic product, GDP, economy

When considering the issue of the origins of gender studies, it can be noticed that one of the many elements that have contributed over time to their creation was interrogation of the conventionality of the prescriptiveness of the biological sex concept (Freud, 1953). Of course, the very concept of conventionality is quite complex; it has causal connotation and probably did not appear immediately in the consciousness of the critics of the social status.

However, the fact that they began to question the cultural status quo shows the appearance at some point in time of some identity rift or inconsistency of observable gender features and functions. In the context of the above statement, one can see the problem of two issues: the possibility of 'noticing' and thus cognition, as well as the

difficulty of determining what gender 'is' at all. Therefore, before further discussion, it is necessary to deliberate upon the problem of epistemology and ontology, without which the considerations can be countless; at the same time, we risk that the parties to a potential dispute will have completely different assumptions about what they are actually speaking about.

First, let us look at the issue of epistemology. Apart from its functional aspect - how it is possible to perceive the gender problem - we can certainly say that when particular social conditions have occurred, the reception itself became available, although it had not been there earlier for some reason. The controversy of gender or gender as a controversy did not exist at all (in any case, not so much as nowadays), until the point at which something has happened that makes it possible to perceive this aspect of social reality existing in real terms.

The sole observation of the problem is obviously not tantamount to understanding it, but it is a necessary condition. What is more, it precedes ontological consideration. The discernment of disharmony and the attempt to deal with it far precedes the possibility of scrutinising what this inconsistency of things is.

First, one notices the symptoms, examines them and finally hopes to discover what one is really dealing with. This is because the knowledge of aspects of things can possibly lead to finding what a problem 'is'. The dilemma exists: it can be seen through relations that it has some observable features, which are usually differently defined and perceived by various observers, but it is not completely clear what it ultimately is. It might seem that this puzzle particularly troubles essentialists, but through the widespread use of the word 'is', it subconsciously bothers almost everyone.

The epistemological consideration seems much simpler than answering similar ontological questions. It is easier to criticise, recognising various aspects of the problem; it is easier through this criticism to form the opinion and the illusion of understanding the dilemma rather than to define what it basically is in an isolated form. It is therefore possible to ask the question of whether such isolation is possible at all? Perhaps cognition through an aspect, through a relation or through an action determines ontology at the same time, as in the case of reflections on the performativity of gender (Butler, 1993).

This issue does not seem to be pure abstraction, but a matter of quite practical importance. Is gender, its role, society, economy and politics separate entities, amongst which a human being tries to act in a morally appropriate manner? Doesn't it seem right

to say that each of these factors does not have its own essence and does not dictate anything by itself?

Perhaps the solidity of the object or its properties is completely illusive? If so, the ethics of action would require taking on a lot of responsibility, as one could not count on any predefined world of norms against which one could resist indisputably. In particular, the nominalist problem of gender and roles related to it would not be a problem of the qualities of a human being himself/herself, just like the problem of various types of systemic errors such as gender bias.

Hence, it would not be a problem of a separate system (e.g. an algorithm or data), but a problem of people to whom it manifests itself and those from whom it stems. Removing the error would therefore mean the need for discussion and commitment provided, of course, that the ontology would exclude its essentiality.

Actor-Network Theory

Considerations on the metaphysics of the gender problem should be carried out using a specific tool, a conceptual framework that allows one not only to describe social processes, but also to present them in terms that make the reasoning possible which will be more-or-less convergent conceptually to the one used by the target area whose problems we are considering. In this case, it is the sphere of information systems and processing[1].

With this in mind, the problem discussed is worth looking at from the point of view of Actor-Network Theory (ANT); that is, the sociological thought, whose intensive development fell on the period between the end of the 1970s and the end of the 1990s. The mentioned time frame is not without significance because IT engineering, in a shape similar to the one, we know now was also rapidly changing. The period is the time of intensive development of algorithms, the beginning of personal computers, their improvement, the penetration of IT technology into the consumer sphere, as well as the creation of computer networks, and finally the Internet and mobile network.

In other words, it is the time of algorithmisation, networking and development of social communication on a previously unknown scale. Although Actor-Network Theory itself has fundamentally originated from the research on science and technology, the ways of constructing a narrative about the world it offers can be easily adapted to a much broader class of social problems (Latour, 2005).

When one uses the ANT terminology, the ontological narrative should be considered in the categories of an actor inseparably associated with a relation network. Gender can therefore be treated as one of the actors revealing certain illusive characteristic features to the outside world. According to the Theory, there is nothing essential in the actor; in particular, it is impossible to say what gender is in itself, without taking into account the relationship of this concept with other actors. Thus, the features mentioned, by definition, cannot only be quantitatively, but also qualitatively perceived by different actors, which - as is universally recognised - usually causes acrimonious social disputes that are basically a reflection of completely different views on the problem.

Therefore, in a somewhat simplified way, it can be said, for example, that LGBT communities will have similar views on a particular aspect of the social gender. Meanwhile, the conservative-rightist narrative will be completely different, not so much with the arguments as with the perception of what the social gender really is: whether it makes sense to identify it, what its properties are and whether the discussion of such a concept is morally right at all. The reason for the differences are relations between actors; in particular, human actors and actors who are ideas created by them.

If ontologically, the gender boils down to a relationship that is also one of the actors, then the role associated with this gender will be the result of the action of this relation, which at the same time can be treated as an actor acting relationally. The actors, as mentioned above, both gender and its role, in the relations in which they enter, reveal certain features that - as in any model - change.

According to ANT, the cause that shapes the new order is the translation, thus the transmission of certain information. Society is constantly shaping the concept anew, continually changing it, making it more flexible. At the same time - according to the Theory - every change destroys the actor. Hence, in particular, the evolution of views causing those changes in the conceptualisation of gender by different communities also cause changes in social roles associated with them. When one moves the hermeneutic circle, nothing remains the same, although a certain conceptualisation is still called the same, e.g. 'gender'. Clinging to one and the same name makes social actors be under illusion that they are dealing with something permanent which, after discourse and cooperation, is constantly changing and spreading over conservative and liberal circles the seed of further disputes about its essence.

Importantly, it would be erroneous to try to show the disjointed relativism of the narrative of Actor-Network Theory. Although things are different depending on the point of view; at the same time, they are the same for certain groups having a common view and thus related to the actor-gender or actor-role-of-gender with a similar class of relation[2]. For this reason, one can look at the creation of communities of sexual minorities, groups of social resistance or counter-manifestation in the face of changes, like at the clustering of actors, or - as Bruno Latour could say - winning over allies and gaining effective power.

In this perspective, the social dispute about gender and the related role clearly acquires a political context. The attempts to push through own models and force the opponent to break relations with his/her view are not so much about justice or the sense of one's own freedom.

First of all, with regard to taking over power and exerting pressure since only with these at hand one may pursue higher ethical goals. As the problem of gender boils down to the problem of power, and having power can be seen as a powerful contribution to knowledge[3], the one who gains the advantage states 'the facts'. This is also an important conclusion for the world, not only in terms of formal administrative power but also the power of modern technologies in which there is, among others, the problem of algorithmic distortions of gender-related issues that show billions of Web users how the world 'really' looks like.

Interestingly, ANT also explains why epistemological issues dominate the discourse and why the ontology of the problem is so difficult to grasp. According to the Theory, a black box, which is an actor, and which has an intricate structure inside as a result of purification, appears as an independent object, but only until it works perfectly, so long as one does not question its functioning or tries to look inside while considering the possible substantiality. That is how it was and is with both gender and social roles associated with it.

Until these issues were not problematised, they did not raise any serious reservations and all the more they were not publicly considered in terms of what they basically are. It is easier to see an actor than to look inside, the more so because this second act destroys it irretrievably (Harman, 2009). After much criticism of the social connotations of sexuality and its roles, attempts to establish their substantive status have been unsuccessful. However, a surprisingly convenient solution turns out to considering them as successive networks of relations and a construct as real as a social agreement,

assigning meaning and community roles to the physical constitution of people and their biological functions.

Although the presented interpretation of the 'gender problem' in the language of Actor-Network Theory helps to discover the relation and network character of the discussed issue, it is worth noting that, in the above narrative, the words 'gender' and 'role' could be changed to almost any other. Indeed, according to ANT, every phenomenon or concept used by society has the same character, which obviously does not necessarily mean that 'facts' are completely arbitrary and 'truth' is only a social construct; although, certainly, the semantic interpretation of these concepts is just an opinion.

The discussion of the concept of fact and truth as well as their possible understanding within the framework of ANT goes beyond the scope of this essay. Nevertheless, the above comment is worth making to ensure that one does not fall into extreme postmodern relativism. The society determines the 'fact' and recognises the 'truth' on the basis of the known relations, but at the same time it does not always know all the relations necessary to make final decisions. For various reasons (e.g. as a result of a lack of awareness of the above or for political reasons), it may hastily recognise the convergence of its views with the interpretation of the observed state of affairs as objective truth, but it may also happen that the adopted model is fully consistent with what it concerns. The simplest example of the latter case are mathematical equations, in which the assumptions and the question posed can be completely and unreservedly determined by the answer.

Summing up the discussion on the ontological and epistemological status of gender and its roles, the fact that, on the basis of Actor-Network Theory, these two concepts have a relational character dependent on other social actors who speak out about them, is noteworthy. The power of arguments, the political advantage and determining how 'really' things are, are dependent on the number of allies in the social cluster as well as their causative power that manifests itself in the quality of their influence on others. The struggle for gender from this point of view is a political dispute, a struggle for power and establishing knowledge.

Both gender and its role have no essence, and the discussion over it can only end with an unstable compromise. The problem of gender and its role was revealed when these, as models with certain properties, ceased to function properly. However, it is easier to see the problem and describe it rather than to grasp its core and its 'actual' state. This

conclusion, in turn, leads further to the issue of ethics and, thus, to moral, professional and political responsibility for gender and its role. It also encompasses responsibility on the part of those who have power and therefore knowledge, at the same time telling others 'how things are'.

Gender bias

Let us now consider the issue of error, which occurs especially often in the context of information processing and, in particular, human perception and algorithmic analyses of big data. As Alfred Korzybski stated in the well-known maxim, 'the map is not the territory'[4]. This statement clearly describes the essential feature of each model; namely, that none of them reflects the fullness of reality, only its selected aspects and, in addition, with some accuracy. Otherwise, one would not talk about the model.

What is more, even when a certain process begins with the desired transmission of information, this transmission is usually lossy if there is no mechanism in its path to correct the errors. The distortion may arise at the stage of reading information, its transmission as well as decoding and recording. The error may result both from the nature of the construction of the relation used to transmit the data as well as its malfunction.

Let us use the example of a human being watching a flower. First of all, the plant does not reach the full spectrum of light, but only a selective one, limited due to its earlier propagation in the atmosphere. Further, the shape of the flower disperses part of the light sideways, and if it was set differently, its image would be slightly different. Then again, the atmosphere stands in the way to the recipient, then perhaps glasses, imperfect eye and the entire mechanism of interpretation of the nervous system, which is influenced by a multitude of factors, including cultural and psychological ones.

Therefore, engineers talk about construction errors, physicists about measurement errors, psychologists about cognitive errors and IT specialists about algorithmic errors. Each of these categories is a collective description of a several possible types of errors, and often their subsequent subgroups. Errors can be classified in a variety of ways, usually in relation to the mechanism that causes them or the effect they cause, in other words, the problem whose mapping they disrupt.

From the point of view of the discussion, what is particularly interesting is the class of the latter type. The set of errors distinguished in relation to the result, the so-called gender bias: a group of errors causing unreliable mapping of gender issues. Taking into account the previous deliberations outlining the subject of ontology and

epistemology in terms of Actor-Network Theory, one can reflect on the nature and the possibility of solving the problem that is widely discussed in both the professional and popular press. Is it possible to avoid gender bias and what would the proper algorithmic representation of the truth about gender be like in the real social world?

GDP

Let us consider the problem of gross domestic product (GDP), the economic indicator used to determine the size of economies and indirectly, by GDP per capita, to indicate prosperity. There are three methods for calculating GDP; namely, the expenditure method that counts the expenditure of all final goods and services, the output method deducting intermediate consumption from the global output of the country and the income method summing up the income from labour, capital, state income, gross mixed income and deducting production and import expenses from them.

Each method should give the same value as a result of calculations. There are therefore three algorithms to lead to the same result, with big data constituting a huge set of economic data of the state and a model according to which GDP is a representative measure of the economy, and, correlated with it, GDP per capita as the measure of personal well-being of a statistical citizen.

Having the above system defined, let us further consider the problem of gender and its role. Let us ask a question how the gender bias factor can be involved both in this system as well as in the social discussion about it?

From the point of view of the mechanism of information transmission provided earlier, one asks the question about the stages and extent to which gender bias is involved in the collection of data on the economy, their processing, transmission, defining the economy itself, in the algorithm of calculating GDP and its social reception resulting in further discussion. In trying to find an answer, it should be noted above all that such a question entails possible internal incoherence. Consideration of the issue within the hermeneutics of Actor-Network Theory suggests that the separation of the system and discussion about it is fundamentally false. The system and discussion are related and nothing can be said about the social model without criticism.

Let us first consider the gross domestic product. According to ANT, this is an actor, and therefore a relational model showing the state of the economy (whatever it is supposed to be). It is a black box without internal substance. If one looks inside, one will find, among others, three algorithms that also have no essence, but a complex internal

structure of different relationships (between numbers, parameters, conditions) and so ad infinitum. The nature of the economy is the same - it is a model and a relational network at the same time.

The network connects people, factories, money, goods and services, but in its infinite structure it includes several other relationships, both objective and functional: households, families, hospitals, spending free time, discussions, cleaning, taking care of children, cooking, shopping, natural environment, etc. Each of these elements is a certain model with conventional parameters whose status depends on a particular relation or relational group. The sexuality and the division into roles and types of specific behaviours in families, farms, perhaps a statistically different way of spending time, different ways of establishing contacts, and thus the very form of creating and maintaining relations, is woven into this network of connections.

Combining the formal definition of GDP as a measure of the state of the economy with the above analysis, it is clearly visible how imperfect this parameter is, how truncated it is, and how selectively it represents the state of social mapping of a part of reality that is the economy. They talk about income or means of production, but not about care for children and free time which, after all, also affects the quality of work, production capacity, personnel resources and several other elements of the socio-economic aspects of life. For example, a mother's care of the child, on the one hand, may lighten the father's burden, allowing him to continue his professional career, on the other, it drives the industry of products intended for mothers and children, while also it causes an entirely new taxpayer to be raised without additional social costs.

Thus, it seems justified to claim that GDP not only selectively analyses the state of the economy, but does not take into account gender roles as an overt parameter. What is more, men seem to be more privileged in the face of the fact that they quantitatively dominate the economic market described by parameters that are accounted for by gross domestic product. Women's work is largely hidden as it is a background that is invisible in the result produced by GDP.

Is such criticism of the economic indicator legitimate? It seems so, but only partially. As the description of Actor-Network Theory indicates, the actions of women and the fact of assigning certain roles by the society to them can never be separated from the result they bring. Correlates cannot be separated by agreeing that there is no relation between them because even such an agreement would again bring with it some information about what one is trying to negate. Hence, if the man's work counts and the

woman's work does not, then it should be borne in mind that neither the man nor the woman function in independent voids.

Still using the mentioned extreme stereotype of gender separation, it can be said that the work of women indirectly influences the work of men. In the family, where the man works and the woman runs the house, the indirect income of the man is the effort of his partner. His income indirectly reflects the state of the house in which he functions; without a woman, comfort and the other resources that a man has at his disposal, then 'fuelling the economy' would be completely different. The actions of people who care for children, the elderly or sick at home, those who care about the background of the first plan of economic life, only seemingly have no impact on GDP. They probably have a huge influence, though immeasurable directly within it.

This is where the core of the problem is revealed. Gross domestic product not only fails to reflect the impact on the economy of works traditionally related to women's roles, but it does so in an implicit and dishonest way; that is, where the importance of women's and men's influence on the GDP result is not the same.

Thus, the thing is not whether the influence of men and women on the economy is identical, but the fact that the calculation method enforces the acceptance of unequal importance of these influences: one counts directly and the other indirectly. The issue becomes even more serious when we notice that, in relation to the way of social organisation, GDP influences society by a mechanism of feedback, perpetuating the perceptively distorted state of affairs.

The state then expects that its economy will have the highest GDP. Not only economic, but also political actions help in achieving this goal, including a specific narrative, consolidating the imbalance perception of what is better and what is worse for the economy and, implicitly, for society. The transition between the latter two concepts is supported by GDP per capita, which equates the fractional GDP with personal prosperity which, after all, has nothing to do with the actual sense of well-being. In summary, it can be concluded that, from the point of view of Actor-Network Theory, neither GDP nor the economy have any permanent status; instead they constitute a conventional social model of selective relations. Although, in general, different relations in networks do not have to be identical in terms of importance; in the case of GDP, modelling the economy and, by using it, the society itself, this happens implicitly.

But what exactly does the word 'implicit' mean here? Since we are considering the problem in terms of ANT, one should also ask the question: 'implicit to whom' or in

relation to whom or what problematic feature of GDP remains or remained hidden? It is here that the hermeneutic circle of considerations closes, allowing one to return again to the question of dispute and split; to a certain gap, which appeared for various reasons, as it happened in the case of questioning the reception of gender in the second half of the nineteenth century (D'Emilio, 1998).

If one was to make a perverse analogy, one could say that in recent times GDP has 'come out of the closet', demanding, with a form of narrow social discussion, to reveal its inherent, non-obvious feature. However, it would be an overstatement to say that up to nowadays no one was aware of the disadvantages of GDP. Hence, as a consequence of some revolution, they were discovered.

GDP in its contemporary form has already been criticised by its creator and later Nobel laureate in economics, Simon Kuznets. The economist in the report for the American Congress in 1934 drew attention to, inter alia, excessive simplification of the formula that can lead to the creation of illusions and abuse in matters at the centre of the conflict of adverse social interests (Kuznets, 1934). It was, however, the voice of a specialist, presented in a narrow circle, apart from the broad public discourse; a relatively hermetic act of criticism, one might say, rather formal than actual in relation to the effect.

In later times, the veracity of GDP came to be questioned more boldly, also indicating the social consequences resulting from its selective way of assessing the state of economic life. Criticism in recent decades has become increasingly common and the cognitive break from the previously cohesive model has become increasingly wider (Gertner, 2010; Lepenies, 2016). The issue of gender and the lack of proper balance in this regard has also been highlighted, demanding equal rights and changing the way in which the economy is evaluated, even proclaiming the emergence of a new feminist economy (Waring, 1988). GDP was also called simply 'sexist' (Havens, 2018).

Although economists first dealt with the issue in a specialized internal dispute, later criticism made the paper, and thus it reached the wider public forum. First, it was found in economic journals for specialists, but later, more and more often, in more popular periodicals. The problems of GDP are currently being discussed in blogs and social networks. Its mistakes and related problems can no longer be hidden in the political act of pushing its adequacy.

In the network investigation to get the flaws out of the internal structure of the system of relations of GDP, one may reflect on another thread - the metastructure of the narrative. Actor-Network Theory would call the discussion a translation in the system of

relations, but the same discussion is also an actor, a black box with a certain internal structure. If one looks carefully at the way it is constructed, it may turn out that it itself has the features that characterize the problem of gender. Joan A. Rothschild writes in his article that '[a] feminist perspective can help us move from a hard technology society to a soft technology future in which values such as harmony with nature, subjectivity, co-operation, and non-exploitation become integral to technological development' (Rothschild, 1981), in the act of opposition towards the current state of affairs while, at the same time, strongly reproducing the stereotype of characters that differ in men and women.

In the details of the discourse design, it may be seen that the systems of relations, translations and networks reach infinitely far, into every area of life. Meanwhile, the language layer, situational descriptions and arguments and the problem of the economic indicator is reflected not only in the economy, in time, social relations, system work organisation or politics, but even in the way one discusses oneself.

New Model

What is the lesson to be learnt from considering the economic indicator? What does it mean that it was accepted, used and questioned, where finally criticism has come to a place where such different people demand greater justice in judgment, including gender equality in the assessment of reality? Does this sequence of events give hope for some correction of the way of describing the social world and creating an indicator devoid of, among others, gender bias?

In view of what has already been said, from the relational and nominalistic perspective that Actor-Network Theory creates, it seems that it will never happen. One algorithm can be replaced by another, but each of them will only show the world selectively. After all, it is only a model and as such, by definition, it constitutes a certain projection, a way of seeing reality. It is impossible to eliminate the disorder of representation - it is like pouring water from one container to another in the hope that eventually one will find such a configuration of vessels, at which point the liquid will disappear completely.

Removal of gender bias in the sense of creating a model consistent with reality is, on the one hand, mathematically impossible and, on the other, epistemologically

impossible, because it is unclear what this reality actually looks like. For each participant it looks a little different and the constructed algorithm is, after all, common.

What is more, the model has a feedback influence on the world it describes - it shapes it, changes it and leads to further discussion. There is no world-in-itself without extricating it from the model that would represent it. If so, it is even clearer that the dilemma of gender imbalance in algorithmic representation is not an objective problem but a political dispute; a way to fight for a world that someone wants and someone else does not. The dilemma is seemingly technological but in fact it leads to moral responsibility for discourse and creation of another wishful representation without the illusion that we are approaching the description of the world as it really is.

Notes

1. Both social discourse, interpersonal interactions and human participation in the world of models, indicators and algorithms, as well as their operation itself constitute, according to this point of view, forms of information processing.
2. Of course, this does not exclude a situation in which some views are shared by wider groups, and even by all.
3. 'We should admit (...) that power produces knowledge (...); that power and knowledge directly imply one another; that there is no power relation without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations' (Foucault, 1995, p. 27).
4. 'A map is not the territory it represents, but, if correct, it has a similar structure to the territory, which accounts for its usefulness' (Korzybski, 2005, p. 58).

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