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GOVERNANCE FOR FOOD WASTE REDUCTION

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Abstract
The waste of already produced food is one of the obvious and disquieting characteristics of modern society. The numbers are truly staggering. The FAO estimates that the world's annual food losses are over one billion tons (nearly 20% of global food production). At the same time, about 783 million people in the world suffer from chronic hunger. And that's not all. UNEP research shows that food production, transportation and disposal are responsible for 8–10% of global greenhouse gas emissions annually.
The problem came in scene in the last few decades. Big is the number of various initiatives to change positively this picture. Many of them are not effective despite of huge invested money (mainly public). The reason is not in the lack of efficiency in such activities. Although few in number, successful projects in this area prove that achieving economic efficiency is possible. The wrong choice of governance mode is the real cause of numerous failures.
The goal of our study is to analyze how appropriate are the known governance modes in the case of food waste. It is a comparative study, conducted by application of institutional approach – Discrete Structural Analysis. We do believe this study could contribute in both theoretical (governance analysis) and practical (development of successful projects) respect.

Keywords: Food waste, Governance, Startup
JEL: D02, L66, M13

Introduction

Unprecedented, in the history, economic growth during the last half century supported human society to solve various social problems. Poverty, illness ratio, hunger, and etc. were reduced substantially all over the world. But new challenges appeared – environmental, behavioral, political, other. One of them is the food waste. It did not exist in more poor and less developed societies. People have used (by themselves or by their livestock) entire produced food. In the modern time it is not possible (because of urbanization), restricted (due to hygiene regulation), and unwanted (as a result of new behavioral models). That is the way food waste came in place. In her recent study, based on newest data of international organizations Mihova demonstrates how serious is it today (Mihova, 2025) – mainly in term of food losses and air pollution.

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It is useful to analyze these data more deeply. Today, in some respect, food waste is related to the development. Not only economic, but the modernization of the society. That is why it is not a surprise that the wealthiest countries are not in the top in food wasting (Tab. 1).

Table 1. Food Waste by Countries per Capita, 2024, in kg

Ranking	Country	Food Waste	Ranking	Country	Food Waste
1	Kuwait	230.38	21	Switzerland	116.78
2	Maldives	204.39	152	Germany	76.91
3	Tunisia	172.83	161	UK	73.72
4	Dominic. Rep.	157.47	172	United States	71.55
5	Egypt	155.19	202	Guam	60.63

Source: United Nations Environment Programme (UNEP), 2024

It is obvious that addressing the problem is not a financial issue. The influencing factors must be sought elsewhere.
Sectoral point of view also could give us data for analyses (Tab. 2).

Table 2. Food Waste by Sectors (%)

Sectors	EU, 2022	USA, 2024
Households (Residential)	54.6	48.2
Farm (Primary production)	10.6	16.8
Manufacturing	11.4	14.7
Food services incl. restaurants	20.8	14.6
Retail and distribution	8.3	5.6

Sources: Eurostat, 2024 and one5c, 2024

Households and food services account for over 75% in EU and almost 70% in the USA of total food waste. These are sectors asking for better practices to change positively the picture.
People waste different product in different volume. A recent study shows that the most wasted foods in UK are (tones per year): bread 900000, potatoes 750000, milk 490000, bananas 190000, salad and vegetable 170000 (Food Waste, 2025). It leads us to the question of the types of food waste. Various classifications of food waste exist. In our study we are looking for proper decision from economic point of view. It means to influence the problem in economic sense – cheaply. That is why we use a simple classification: a) preventable food waste – food that is suitable but undesirable for consumption (leftovers from previous meals, stale food, expired

products), and b) non-preventable food waste – i) good food that has not been consumed due to organizational and behavioral reasons, ii) leftovers – frying fat, marinade from canned products, and etc., and iii) natural parts of food product which are not used by human but could be used for other purposes (peels, rinds, cobs, shells).

The economic side of the problem. Methodology

Food waste is a complex problem with various aspects – simple economic (loss of costs for production and delivery), environmental (metrane gas pollution), social (millions of permanently hungry people). In such cases, modern economic theory is interested in finding effective modes for organization of the relevant economic transactions. Economic agents develop and use various modes (Bachev and Terziev, 2018):

- market modes (invisible hand the of market) – these are various decentralized initiatives governed by the free market price movements and market competition. Such as instant exchange, spotlight exchange, "classical" contracts, lease or sell contract, and etc. Businessman use (adapt to) markets for making profit from division of labor and specialization of activity and mutually beneficial exchange, while their voluntary decentralized actions "direct" and "correct" the overall distribution of resources between diverse activities, sectors, regions, countries. Despite of some problems – missing markets, monopoly or power relations, negative externalities, asymmetric distribution of information, negative partners' behavior and other, market is a dominant mode in economic exchange;
- private modes (private or collective order) – various private initiatives, contractual and organizational arrangements, codes of behavior, partnerships, cooperatives and associations, brads and trademarks, labels, and etc. Economic agents take advantage of the economic, institutional and other opportunities, and deal with institutional and market deficiencies through selection or designing beneficial private forms and rules for governing their behavior, relations and exchanges. Private modes negotiate own rules or accept existing private or collective order, transfer existing rights or establishes new rights, and safeguards absolute and contracted rights of agents. Nevertheless, the many examples of private mode failures in governing of a socially desirable activities, it is popular and intensively used form in the modern economic world;
- public modes ("public order") – various forms of public interventions in market and private sector such as public guidance, regulation, assistance, taxation, funding, provision, property right modernization, etc. In some cases, the effective direction of individual behavior and organization of certain activity through market mechanisms or private negotiation takes a long period

of time, or is costly, or could not reach a socially desirable scale, or be impossible at all. Thus, a centralized public (community, government, international) intervention could achieve the desirable state faster, more cheaply or more efficiently. Positive examples are provision of information and training for private agents, stimulation and (co)funding of their voluntary actions, enforcement of obligatory order and sanctioning for non-compliance, direct in-house organization of activities (state enterprise, scientific research, monitoring), etc. However, there are a great number of "bad" public involvements (inaction, wrong intervention, over-regulation, mismanagement, corruption) leading to significant problems in economic development;

- hybrid modes – various combination of the above three modes like public-private partnership, public licensing and inspection of private initiatives, and so on;
- institutional modes (rules of the game) – that is the distribution of rights and obligations between individuals and groups, and the systems of enforcement of these rights and rules. The spectrum of rights comprises material assets, natural resources, intangibles, activities, working conditions and remuneration, social protection, clean environment, food and environmental security, intra- and inter-generational justice, etc. The enforcement of rights and rules is carried out by the state, community pressure, trust, reputation, private modes, or self-enforced by agents. A part of the rights and obligations is constituted by the formal laws, official regulations and standards, court decisions, etc. In addition, there are important informal rights and rules determined by the tradition, culture, religion, ideology, ethical and moral norms, etc. Institutional order never creates equal incentives, restrictions, costs, and impacts for all economic agents. For example, bad defined or enforced property rights lead to inefficient and unsustainable organization and exploration of natural and other resources, constant conflicts among interested parties, and low economic, social and ecological efficiency and sustainability.

The economists search the proper mode for each particular case by application of Discrete Structural Analysis. It is a qualitative rather than quantitative (Simon, 1978) and comparative not absolute (Coase, 1960) analytical tool working by *first order economizing (getting basic alignments right) rather than second-order refinements (adjusting the margins*) (Williamson, 1996). Also, modern economics: a) applies intensively individual case study analyses instead of aggregate data

(Deaton[1], Ostrom[2]) and b) uses logical descriptive construction rather than mathematical models (Williamson[3]).

The study

We concentrated our research efforts on studying the households and food services which together account for three quarters of the whole volume of food waste, as it was shown above. In studying our research object, we fount various governance modes all over the world.
The oldest mode for food waste prevention is institutional – firstly informal and later formal.

Institutional mode

For many centuries people did not throw food waste outside the home because it attracts insects, reptiles and wild animals. It could be seen even today, not only in less developed societies, but also where people live close to the nature. Good example is a bear problem in some provinces in Canada, even in big cities like Vancouver. There is no and there never existed written regulation for this purpose. People have done it following one of the major informal institutions – tradition (wisdom from the past). In present days, this practice is renewed in a modern form. More and more adolescents visit shops and restaurants who declare they care about wasting food. This behavior is born not because of acting law but because of the new generationer's believes and mental models.
In a modern time, formal institutional arrangement came in place. Usually, France is pointed out as a pioneer in the field. It's huge and refined food industry (including beverage production) had generated big amount of food waste. In eighties of the last century tax stimulus have been introduced as an attempt to cope the problem. Detailed regulation has been developed by National Pact against Food Waste (2013), the Garot Law (2016) and the Egalim Law (2018). Connecticut was the first state of the US with similar type of regulation from 2011 requires recycling of food waste. Vermont is following a year later. UK is a leader in soft institutional measures application. The 2005 Courtauld Commitment (later UK Food and Drink Pact) became the world's first voluntary agreement to tackle food waste. It has been followed by governmental campaign Love Food Hate Waste in 2007. Italy (also a

[1] …has helped transform development economics from a theoretical field based on aggregate data to an empirical field based on detailed individual data.
(https://www.nobelprize.org/prizes/economic-sciences/2015/press-release).
[2] *Economists using nationwide statistical data are critical of economists using the experimental lab to test* theory (https://www.nobelprize.org/prizes/economic-sciences/2009/ostrom/biographical).
[3] *…his theory of the firm is relatively informal.* (https://www.nobelprize.org/prizes/economic-sciences/2009/williamson/facts /)

big food producer) started with the Good Samaritan Law (2003) which encourages restaurant to donate uneaten food. The main political document is the Zero Waste Charter (2011) accepted and signed by more of the Italian municipalities, agreeing to implement policies for food waste reduction.
Today, the most of the countries have their own legislation on food waste prevention and reduction. International regulation also exists. Two are the main approaches: a) restrictive – based on sanctions and b) attractive – offering stimulus. As in many other social areas, formal institutional mode demonstrates its' weaknesses – it is uncompleted (not able to cover fully the problem) and late (low flexibility in comparison to technological and economic innovation). Restrictive approach is hardly enforceable and stimulates fraud, lies, free riding and other forms of negative behavior. Attractive approach directed efforts to the consequences, not to the essence of the problem (more food waste – more action for its utilization – more stimulus).

Public mode

Public mode, along with the institutional one, is the most popular approach to deal wit food waste today. The main measures are of two types. Firstly – various campaigns initiate and organized by public authorities (national and international), and finance by public funds. Popular examples are: *Zero Hunger Challenge* (United Nations), *Zero Waste, More Taste* (European Commission), *Think.Eat.Save* (United Nations Environment Programme), *Youth Towards Zero Food Waste Campaign* (Food and Agriculture Organization, the World Food Programme, and the International Fund for Agricultural Development), *The Food Recovery Challenge* (United States Environmental Protection Agency), *United Against Food Waste* (Dutch Ministry of Agriculture, Nature, and Food Quality), *I Love Leftovers* (Victoria State Government, Australia), and many others. The goal of such initiatives is to change peoples' habits and behavior. Which is an important issue but need much time. If there are any results they come after a long period and are hardly measurable. Nobody could asses the efficiency (financial or other) of such campaigns.
The second form of public mode consists of programs for (co)financing of food waste prevention and reduction by public (national or international) money. Big is the number of such opportunities. United Nation Organization (through its' agencies), European Commission, The World Bank, European and other regional and national development banks, national governments, and etc. organizations offer such opportunities. Some of them are specialized in food waste reduction, other are general but include related options[1].

[1] In our study, we do not consider the case of food banks. Usually they are public structures (the Bulgarian Food Bank is a division of the Bulgarian Red Cross). They are also major players in the sector. Their work has economic aspects – organizing the activity and people, supplies and logistics, financing costs, even using (rarely) credit. There are also economic effects in relation to poor

Our analysis shows that these programs work more efficiently in developed (in economic and social respect) countries. It is due to the need of: a) (partial) own finance, b) high administrative capacity of operators, and c) readiness of the consumers the take higher food prices. Also, these programs demonstrate low flexibility (their goals and eligible actions are fixed in advance), and do not stimulate innovative entrepreneurship (because of many formal requirements and control mechanisms).

Private mode

Unknown is the number of private initiatives in the area of food waste. One of the most popular is the IKEA ambition to become circular and climate positive by 2030. For six years (2017-2022) Ingka Group (largest IKEA retailer) reported for 54% reduction of food waste in its IKEA stores in 32 markets, which means more than 20 million saved meals and 36,000 tons of CO2 avoided, and $37 million lowering IKEA costs annually. Thus, IKEA became the first global company to demonstrate that achieving the UN Sustainable Development Goals is doable and economically beneficial.

Many other companies develop, fund and implement their own programs for food waste prevention and reduction. They rely on cost reduction (following IKEA case), building positive image, and rising their customer's trust and confidence.

Hybrid modes

The most modern mode in tackling the food waste problem today is hybrid. That is a combination of the modes mentioned above and in fact is a practical realization of the idea of Elinor Ostrom for Polycentric Governance (Ostrom, 2010). We have found hundreds of such initiatives around the world. Striking example is the British Waste and Resources Action Programme (WRAP). It is a business entity (limited by guarantee company) established in 2000. During the next years it attracted all UK governments to finance its activities in food waste prevention and reduction. Later international organizations as European Union and the United Nations also joined in. The main lesson from such initiatives is that the coordination between participating organizations is a hard issue. That is why a strong leadership is needed. In 2007 British author Emma Marsh (farmers daughter) was appointed as a head of WRAP's Love Food Hate Waste campaign. It is one of the first in the world campaign that aims to reduce especially household food waste. Under Marsh's leadership the campaign becomes a highest asses initiative in the field. Similar is

communities. But they work through donations and charitable organizations. Usually, their activities are strictly defined by law. The purpose of their existence is social; such are the motives for their functioning. They are certainly of interest from a management perspective, but not from a governance one.

the case of the US Rethink Food Waste through Economics and Data (ReFED). It is established in 2015 by over thirty industry, nonprofit, and government leaders committed to reducing food waste, chaired by the American venture philanthropist Jesse Fink. Today it is a leading evidence-based action to stop wasting food.

International organizations could also play the role of initiator and leader of a hybrid mode. In October 2020, The World Bank issued two sustainable development bonds for US$ 550 million to promote awareness of the importance of combatting food loss and waste. The leading operator is Nordea Bank. The bonds drew in over 30 investors (public and private), primarily from Scandinavia but also Germany, Japan and the UK.

Market mode. For a long period of time, it was widespread opinion that food waste could not be an object of a for profit activity. I.e. there is no room for market in this field. Many companies (big or small) proof that it is not true. Food waste prevention and reduction could be economically efficient, mainly by optimization of supply and by saving utilization cost. Even before the emergence of this modern trend there has been a long-lasted tradition of pure market measures. Food stores reduce the prices of their products towards the end of the day, which creates an incentive for customers. The same practice is typical in takeaway food stores and restaurants (happy hours) – reduced prices for market transaction. The role of private commercial banks has to be mentioned also. During the last two decades they have started to finance business projects for food waste prevention and reduction implemented by private economic agents. Here, as in any other markets, economic coordination is a main burden, due to information asymmetry and location dependance.

People in their economic life during the centuries ago have developed so many different modes of governance because no one of them is universal. Each has its own advantages and disadvantages. In Table 3 we summarized some of the results of our analysis.

Table 3. Characteristics of Food Waste Prevention and Reduction Governance Modes

Modes	Strengths	Weaknesses
Market	Efficiency, flexibility, dynamics	High risk, no guarantees
Private	Avoiding risk	Low flexibility
Public	Lowering risk	Mistakes, inefficiency
Hybrid	High involvement	Hard to develop and run
Institutional	Offering stimulus and sanctions	Slow functioning

Source: Authors' analysis

Searching a Governance mode for food waste reduction. Theoretical background

In the text above we use many times the term "food waste prevention and reduction". Now, we have to separate prevention from reduction. By technological reasons, prevention is an organizational issue. It consists of supply, stock, and operations optimization. These are traditional managerial tasks, but not governance. The case of reduction is different. Even the best prevention is not able to excludes waste. That is why food waste exists ever and the term "non-preventable food waste" is on scene. This part of food waste is still great and it is better to reduce it. Namely, for this part of food waste we are searching a proper governance mode – governance mode for food waste reduction.

At first glance, market should be a natural alternative. There is supply (shops, restaurants, households), there is demand (manufacturers and people needed food and ready to buy it on reduced price). No monopoly is possible. Government intervention is stimulating. But, at the same time:

- information is asymmetrically distributed. Buyer hardly (costly) could get to know in details the product before the deal. Often there is no time to do it even it is technologically possible;
- high uncertainty in everything related – sales, consumption, volume of waste, real quality, safety, expiration periods, and etc.;
- lack of guarantees. No one sanitary and hygiene agency will allow establishing of guarantees for food waste;
- opportunism is highly possible – a typical situation in case of asymmetric information and no guarantees;
- because of everything listed here, economic coordination between sellers and buyers faces many obstacles, even physical connection is hard due to territorial distance.

That is why, it is difficult to organize these transactions and a special governance mode is needed. The picture is reminiscent of the early years of modern business – global, complicated, competitive. Everything is new, there is no accumulated experience, but quick decisions are needed. In this case we turn our attention back to the classical theory of entrepreneurship. After a deep theoretical analysis Mihova highlights the ideas which are useful for searching a proper economic mode for food wase reduction (Mihova, 2025).

Creative destruction is the fust one. Although the term was found earlier in various sciences, Joseph Schumpeter is accepted as its author in entrepreneurial theory:

> *The opening up of new markets, foreign or domestic, and the organizational development from the craft shop to such concerns as U.S. Steel illustrate the same process of industrial mutation – if I may use that biological term – that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative*

> *Destruction is the essential fact about capitalism… The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates* (Schumpeter, 1942).

The creation and introduction of innovations of any kinds that replace existing structures is an intrinsic feature of a free economy. Moreover, it is the engine of economic development and progress. If all existing governance modes are not good enough (as it is shown above) a new one is needed to reach success. To be innovator and visioner is the most important characteristics of successful entrepreneur (Schumpeter, 1934).

Later, Israel Kirzner[1] further develops this point of view. He sees the entrepreneur as a discoverer of new market opportunities – *innovations until now conceived by no one at all* (Kirzner, 1973), whose role is to notice inefficiencies and gaps in the market. In this sense, the entrepreneur brings the market closer to equilibrium by correcting errors and filling gaps

Dynamic Capabilities is one of the newest theories in the field. It is *the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments* (Teece at all, 1997). A competitive advantage could be achieved by three processes – *Sensing* (for new opportunities and threats), *Seizing* (decisions making to generate value from identified opportunities), and *Transforming* (reshaping and reorganizing the company's resources and processes to adapt to changes in the environment) (ibid.). These theories teach us that in dynamic and unpredictable situation economic agents need of:

- economic innovations to replace the existing models;
- mechanisms for filling the gaps and for adaptation;
- tools created competitive advantages.

Startup – a possible good decision

Here we are presenting a part of the results of our study – demonstration of the analytical approach for studying economic nature of food waste. It is not a purpose of this text to provide a reasoned decision. But we will still conclude our analysis with a look ahead.

Disadvantages of traditional governance modes in the sector of food waste reduction requires non-traditional decision. Mihova proposes that it is Startup. She explains:

> *The market uncertainty in which startups thrive shapes their business logic and behavior patterns. Rather than relying on established structures and processes,*

[1] Laureat of Global Award for Entrepreneurship Research (2006)

> *they often build their competitiveness through specific economic advantages – innovation, adaptability, strategic advantage and flexible access to capital. It is precisely these qualities that allow them to create economic value and sustainability in the field of food waste management, even in the absence of an established global methodology to address the problem* (Mihova, 2025, p. 19).

Based on our study we could describe the economic nature of Startup[1] as a governance mode which is:

- dynamic and fast reacting (due to the feedback of the supporters) and so exceeding institutional mode;
- flexible (due to the lack of bureaucracy) and thus better than public mode;
- innovative (due to a high financial freedom) more than ordinary private structures;
- able to solve informational, cognitive and behavioral problems in cheaper way than the market does it:
- not simply a hybrid mode, but a new governance mode.

Conclusion

Food waste did not exist during a long period of human civilization. The problem is one of the newest. Internal organization and charity are well-working alternatives for solving it. But only for a part of it. The quantity of not-used food around the world is so big that we need also other mechanisms. We need a business-oriented mechanisms that will harness the boundless power of the market to solve this socially shameful problem.

In this study various governance modes are analyzed and examined as tools for food waste reduction. Advantages and disadvantages of each of them are discussed. Finally, the Startup is shown as a better alternative. It's probably too hasty to view a startup as a standalone governance mode. Doing it we hope to provoke future discussion both from theoretical and practical point of view.

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[1] Speaking for Startup we have in mind a business unit: a) created by people with innovative ideas, and b) funded by supporters (crowdfunding) or by venture capital. For us, structures owned by the richest man in the world, or financed in administrative manner, or directly established by public proxies, or etc. are not Startups, although they formally bear this title.

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