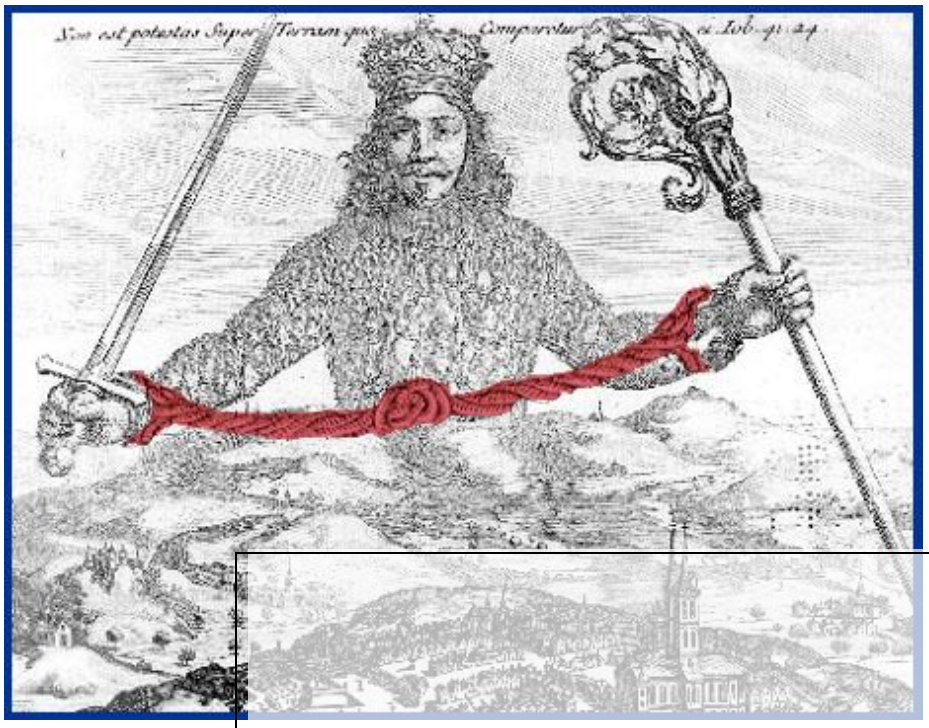

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# *Social Nudging with Condorcet Juries and its Strategic Implications for a Paternalistic Implementation of LED bulbs*

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# Social Nudging with Condorcet Juries and its Strategic Implications for a Paternalistic Implementation of LED bulbs

Bettina Kalmbach

## Abstract

In the light of irrational behaviour and decision biases leading people to commit systematic blunders, Thaler and Sunstein (2003) presented in their approach of libertarian paternalism the concept of choice architecture, to face the problem of wrong decision-making and resulting welfare losses by "Nudging" irrational agents. The debate about this approach focuses on its compatibility with libertarian principles, on its welfare-enhancing character and on the knowledge problem about peoples´ true preferences. The goal of this paper is to show in part I that with recourse to contract theory, applied constitutional economics provides a justification of both the libertarian character and the profitability of libertarian paternalism. The use of libertarian paternalistic policies for environmental in particular to promote the acceptance and purchase of climate-friendly and sustainable LED bulbs can be justified as a self-binding commitment induced by hierarchical preferences for sustainability. Referring to the Condorcet Jury Theorem, stating that 1) an expert jury is always more competent than a single expert and that 2) for large juries, group competence tends to infallibility with an increase in group size, libertarian paternalism for ecological goals can be defended against the knowledge problem. In part II an extension of the Condorcet Jury Theorem relaxing its restrictive assumptions of binary choice, homogeneous and independent voters, investigates its applicability and reliability for paternalistic interventions and allows a new perspective in the debate of choice framing paternalism, namely the concept of "social nudging" to promote social long-term goals. This paper provides an approach of effective choice framing by applying the CJT and implementing expert juries with the subsidiary principle. It investigates with regard to the support of sustainable "light-consumption" how far institutions should go in shaping choice situations of consumers to promote their welfare.

## INTRODUCTION

Individuals often fail to make rational decisions that are consistent with their long-term preferences. They commit systematic blunders either due to natural or to cognitive constraints. Cass Sunstein and Richard Thaler develop in their approach of libertarian paternalism, a soft form of paternalism without coercion, which is possible due to the sensitivity of preferences to the choice frame. A purposefully designed choice framing, a so-called "nudge" shall steer choices of irrational agents in a predicted and desirable direction to improve the chooser's individual welfare. Critics raise doubts about the libertarian and welfare-enhancing character of this approach. They emphasize the likewise bounded rationality of a choice architect, who is in charge of soft paternalistic policy making, and who has the incentives to abuse the knowledge about cognitive misgivings of individuals. Like any other form of paternalism, soft paternalistic policies are as well subject to the Hayekian *knowledge problem*, stating that no policy maker can know better what is in the best interests of an affected individual, than the individual itself. Another main topic to criticize this approach is the vague and broad definition of situations and decision contexts in which libertarian paternalistic policies should be implemented, and who should be in the position to frame decision contexts. Libertarian paternalists use the individual´s own subjective "well being" as the basis for regulatory policies however critics mention conceptual misgivings about an underlying notion of welfare to guide the paternalistic planner.

Part I illustrates that, pointing out the character of consensus of soft paternalism and voluntary individual delegation of decision competences on constitutional level, in order to minimize decision costs and errors on post constitutional stage, applied constitutional economics serves as justification for both, the profitability and the libertarian character of soft paternalism. Findings from behavioural economics may then offer promising possibilities for (approvable) environmental policies such as the implementation of higher market acceptance of sustainable LEDs. Referring to the work of Marquis de Condorcet who argues for a calculus that provides a proper guarantee for majority decision of a

parliament or an assembly being correct, the Condorcet Jury Theorem (CJT) can defend approvable soft paternalistic interventions against the knowledge problem. Furthermore it offers a hint who should be in the position of a choice architect. Given there exists for an individual with incomplete information a welfare maximizing option in a choice set, the theorem states that a jury of experts under certain conditions with a simple majority voting is more competent to find the welfare maximizing option than the respective individual itself. When soft paternalistic choice framing is given over from one planer to expert juries (on post-constitutional level), choices made by those expert juries are more likely to be correct than individual choices and may even converge to infallibility, while decision costs remain at a moderate level. Considering the approach of Sunstein and Thaler the CJT can provide a normative justification of soft paternalism regarding the knowledge problem.

In part II an investigation of the conditions, under which the CJT holds, furthermore allows a more precise definition of the underlying notion of welfare as basis for regulatory policies. This paper contends that in the course of an extension of the CJT by relaxing its assumptions of homogeneity and independence among jury members as well as the binary choice the CJT can provide efficient inquiry in true preferences, if social values and common interests are determining these (long-term) preferences of voters. In these cases expert juries are able to identify and promote true social preferences and make "better choices" than individuals. Assuming the existence of common interests, and juries implemented according to the subsidiary principle, the CJT can be adopted as a normative guideline to capture precisely citizens´ signals about true preferences, to consider welfare effects and to make correct decisions about nudging policies.

This classical interpretation of the CJT as a mean to find a common moral or social good goes in line with the contract theoretical approach of the "General Will" by Jean Jacques Rousseau's and justifies its application from the constitutional economics perspective as a mean to develop social preferences. The application of the CJT then offers possibilities to find appropriate means to achieve social welfare in promoting "right" consumption decisions. While

Sunstein and Thaler use the individual´s own well being as the basis for regulatory policies and focus on consumer protection, health and retirement provisions, this article focuses on social welfare generated by voluntary self-binding to sustainable consumption. Directing to the market acceptance of sustainable LED Bulbs it investigates how far nudging policies to promote values for sustainability, may improve social welfare and lead to a higher market acceptance of LEDs as well as a paradigm shift in consumer behaviour, while still respecting consumer's sovereignty. Furthermore it derives implications for a policy strategy to implement soft paternalistic institutions to increase the market acceptance of sustainable LEDs.

## PART I: SOFT PATERNALISTIC IMPLEMENTATION OF LEDs FROM A CONSTITUTIONAL ECONOMICS PERSPECTIVE

### 1. Libertarian Paternalism – its Potential and its Critics

Recent findings of behavioural economics have raised doubts about the rationality of peoples´ judgements and decisions. Either due to uncertainty about the future loss or risk aversion and overconfidence in their own forecasting abilities, people exhibit irrational expectations and fail to make forecasts that are consistent with Bayes´ rule. Instead they use heuristics that lead to systematic decision biases such as endowment effects status quo orientation inertia anchoring and framing effects. In Addition, cognitive shortcomings result in wrong or slow information processing and errors. This lack of cognitive ability can mainly be put down to the existence of two different modes of thinking and deciding. Automatic operations of perception of the intuitive cognitive system 1 predominate the deliberate operations of reasoning of the rational system 2 in the information processing and decision-making. Most choices are made fast, effortless and intuitive within the System 1 while System 2 is only at work for explicit judgements under an effortful deliberation process. Intuition often fails to be rational, so people exhibit preference reversals and inconsistencies. They make different decisions depending on the design of the decision problem. Short-term preferences are unstable context dependent and in the case of intertemporal choice inconsistent with long-term goals (Thaler & Sunstein, 2003).

People value present consumption much more than future consumption, overrate own decision-making capacities and underestimate severe risks such as future fees for the present consumption or negative health effects. These systematic blunders and self-control problems evoke severe economical and psychological welfare losses (Kahneman, 2014).

Thaler and Sunstein considered in their approach of libertarian paternalism (also headlined as *asymmetric* or *soft paternalism*) these findings of behavioural economics. They introduced the concept of choice architecture to face the problem of incoherent preferences and systematic decision biases. In the case of bounded rational individuals, a carefully designed choice framing should influence peoples´ choices in a predictable and desired direction to enhance their well-being. They defend their agenda as a weak and nonintrusive type of paternalism helping irrational people to overcome cognitive shortcomings, while imposing no, or just minimal costs on those, who decide fully rational (Thaler & Sunstein, 2012). The authors claim, that this kind of interference in individual decision-making respects "freedom of choice" and is acceptable even for to committed libertarians. Choices are neither blocked nor fenced off. The planer respects personal autonomy and does not prescribe or proscribe any particular option, after all people can easily opt out of the recommended choices (Thaler & Sunstein, 2003). Thaler and Sunstein contend, that this minimal kind of paternalism is inevitable and public or private institutions that control choice frames will compulsory shape peoples´ preferences and choices because in the case of ill-formed or unclear preferences that vary with the design of the decision context, choices are inevitably influenced by default rules, starting points or the framing of the decision problem. Libertarian paternalistic policies should then be designed in the way, that the framing of the decision context imposed on an individual improves with soft incentives the chooser's own welfare (Thaler & Sunstein, 2003).

Critics against this the libertarian paternalism as a form of public decision-making are mainly based on the idea of normative individualism considering only the individual itself to being in the position to decide in its best interest, and only if it is free to choose, otherwise any kind of state intervention provokes

redistributive effects and welfare losses. Glaeser (2006) expects public decision-making even to increases cognitive biases and systematic decision errors. He argues, that soft paternalistic policy makers are subject to the very same cognitive shortcomings and decision biases. Beside the sensitivity of the choice architect´s decisions to outside influences, he states that decision biases and collective errors carried out through voting i.e. by an "irrational median voter", will even increase just in a more complex manner and on higher institutional level. Furthermore he expects error correction on private level to be more successful, as private incentives to reduce errors are stronger and private costs of learning are lower. Thus public decision-making does not prevent to make systematic errors, and, due to bounded rational policy-makers and a lack of transparency, libertarian paternalistic policies are more difficult to control and easy to abuse (Glaeser, 2006) (Rebonato, 2012). Following these Arguments opponents of libertarian paternalistic policies emphasize beside the lack of transparency, as well as a missing narrow definition of the situations *when* nudges should be implemented (Mitchell, 2005) (Grüne-Yanoff, 2012). Above all the Hayekian knowledge problem faces Libertarian Paternalism as well as any other harder form of state intervention. Rizzo and Whitman (2009) argue that policy-makers do not have the access to the knowledge needed to implement welfare improving policies. Thus no policy-making agent is capable of knowing better, what would be in the individual's best interest than the individual itself. Committed Libertarians expect rather the individual to know about their preferences far better than any third party does (Rizzo & Whitman, 2009). Furthermore, proponents of libertarian paternalism express scepticism about the notion of preferences used in welfare economics, referring to irrational choices made by individuals, but their "true" preferences to consider welfare effects do not formally exist. Grüne-Yanoff (2012) expects an inquiry in individual preferences to derive social values and a socially desirable behaviour to fail, due to this lack of information (Grüne-Yanoff, 2012). The weak spot of the concept of libertarian paternalism pointed out, is that it does not endorse any particular measure of welfare that can guide a planner to track anticipated choices to enhance welfare. In so far, Thaler and Sunstein avoid the issue of what exactly welfare-enhancement should look like, which constitutes the most

difficult and important question raised by welfare focused paternalism (Mitchell, 2005). There is no normative criterion for libertarian paternalistic policies when it comes to the a goal that a planner should try to achieve as well as the definition who should be the "over-all-rational planer" who would be in the position to "nudge" individuals.

## 2. Constitutional Economics as Justification – Libertarian Paternalism as Collective Self-Binding of Reflective Preferences

Most critics against libertarian paternalism refer to the classical principle of normative individualism. A justification of soft paternalism is hardly to find sticking to this economic model as it uses a utility function with many dimensions but only one level. Individual decisions-making however shows evidence for phenomena like weakness of will and time inconsistencies. In these points the traditional economic approach fails (Kirchgässner, 2014). A rejection of soft paternalistic interference referring to the absence of allocative biases and market failure neglects cognitive biases of revealed preferences. In the argumentation of libertarian paternalists welfare judgements based on a biased normative criterion of revealed preferences are expected to exhibit the same errors. Referring to the two-system-model of cognition used in behavioural economics, proponents of libertarian paternalism argue that "[...] the fact that human persons reflecting on themselves usually take on the long-run perspective rather provides evidence for the long-run preferences, as does the fact that individuals often heavily underestimate the costs of the actions that are guided by their short-run preferences." (Kirchgässner, 2014). Thus they assume individuals that are able to determine long-term preferences, which are rated over short-term desires, and to judge about the consistency of short-term and long-term preferences.

"Otherwise it is difficult to understand why people regret their own earlier behaviour when foreseeable consequences become obvious that were not taken into account before." (Kirchgässner, 2014). This model of hierarchical preferences explains how people bind themselves to overcome weakness of will or cognitive shortcomings in order to achieve long-term goals (Kirchgässner,

2014) and goes in line with the behavioural economics model of two cognitive systems. Referring to huge evidence for private self-binding, libertarian paternalists base their welfare judgements and policy implications rather on these long-term "meta" preferences, which they consider to be a "less-biased" and more reliable criterion, (Thaler & Sunstein, 2003). If self-binding is established not only on individual but on collective level, soft paternalistic policy interventions can be understood as a type of collective self-commitment to higher ordered preferences introduced through the political process. These *reflective preferences* have higher relevance and are easier to follow in the political process. Individuals are unaware about the costs for violating their short-term preferences during the voting process while they suffer the costs of refraining short-term desires immediately on markets. However taking a long-run perspective they can reflect about the cost of violating long-term preferences, that become relevant in the future. (Kirchgässner, 2014). The relevance of higher ordered preferences in the political process is observable when for examples third persons´ interests as well as moral or ecological values are more respected. The Model of hierarchical preferences then provides a justification for paternalistic policies and fits with the normative individualism. Following this argumentation does no longer allow the use of normative individualism as a principle objection against merit goods or paternalistic policies (Kirchgässner, 2014).

Furthermore hierarchical preferences defend the approach of libertarian paternalism against critics about its welfare-economical underpinning because they can become integrated into welfare economics. Kirchgässner (2012) points out that in this sense critics about the redistributive effects appear exaggerated (Kirchgässner, 2012).

Collective self-engagement induced by hierarchical preferences corresponds to the analogue model of John Rawls´ contract theory "Justice as Fairness" where people decide in a *natural state of original equality* and behind the *veil of ignorance* in their own interest but without interests against each other, about the principles to determine fundamental arrangement of social and political cooperation. In this natural state individuals do not know how they end up in the

later political process neither how decided rules will directly affect them. Due to this lack of information about the future individual situation long-term preferences are likely to dominate (Kirchgässner, Sanfter Paternalismus, meritorische Güter und der normative Individualismus, 2012).

Rawls contends that if individuals reason in the natural state about a constitutional design, the veil of ignorance is the best model to track the reasons of the people and decided institutional settings reflect their rational preferences (Rawls, 1971).

The profitability and efficiency-enhancing character of libertarian paternalism can then be justified from the perspective of contract theory, by pointing out its character of consensus and referring to Buchanan´s applied constitutional economics (Vanberg, Albert, & Goldschmidt, 2009). Government undertakes the task of preserving the existing legal system on constitutional level, as a regulatory framework of legal allocations like entitlement-granting rules or procedural norms against which contracts are made (Sunstein & Thaler, 2003). Government's function on the post-constitutional level however, is to design institutional frameworks that enforce the mutual advantages of decided legal setting. This efficiency-analysis of economic policy refers to the long-term process of the realization of gains from trade. In Buchanan´s applied constitutional economics, the *voluntary approval* of contract parties as normative criterion for the realization of long-term gains is transmitted to the post-constitutional level where regulatory changes are proposed and adopted. According to the view that gains from trade are only possible if legal frameworks enable and support their realization voluntary approval serves also in constitutional economics as criterion, to indicate how far collective acting in the political process can realize and support the achievement of long-term goals and create collective advantages. Thus voluntary approval of affected citizen to rules and regulations serves as criterion to judge about the efficiency and desirability of institutional rules and regulations. To what extent they represent the interests of affected citizen and support their realization, relies basically on their prevailing potential of consensus (Neumann, 2013, p. 136). "Such constitutional choice of constraints is a most important means for individuals, separately and jointly, to achieve their self-chosen goals (Vanberg V. J., 2014, S. 341).

Applied constitutional economics identify and propose institutional designs being potentially approvable by affected citizens, in a consulting manner. Those will be informed e.g. by a hypothetical imperative which arrangements would be helpful to achieve certain goals. The decision about these goals however remains up to the citizens and respects electoral individualism. In the process of voluntary approval citizens decide according to their individual values that are not necessarily goal-oriented (Neumann, 2013, p. 134). Thus it can also include a social or a moral value, which exceeds the model of the *homo oeconomicus,* used in classical welfare economics, but respects the normative individualism. Libertarian paternalistic choice architecture as constraints on consumers´ choices is both, liberal and efficiency enhancing if its design draws from a voluntary constitutional choice of affected individuals and respects the individual as ultimate sovereigns (Buchanan, 1991, S. 227). Individuals remain as principles and decide about the desirability of paternalistic interference as well about how and which interference relate to their individual long-term goals. In accordance of the Rawlsian idea of an *overlapping consensus*, in Buchanan´s applied constitutional economics, constraints that find the approval in the political process and are carried out on the post-constitutional level, reflect those self-binding Nudges, which maintain liberal principles and generate mutual advantages. Thus libertarian Paternalism, if voluntary approvable, relying of Rawls´ and Buchanan´s constitutional theory can be both liberal and efficiency enhancing.

## 3. The Condorcetian Safeguard for Libertarian Paternalism

Critics concerning the profitability and libertarian character of soft paternalistic policies can be weakened referring to the contract theoretical model. Although Sunstein and Thaler create with the reference to consumers´ sovereignty this important link to the contract theoretical work of John Rawls, their justification of libertarian paternalism is more related to the lack of rationality, that let people fail to maximize their utility according to their long-term preferences. As libertarian paternalists raise doubts about the normative criterion of preferences

revealed by choice it is important to point out that the analogy to the situation of collective self-binding only holds as long as one assumes the predominance of reflective preferences on constitutional level (Kirchgässner, Soft Paternalism, Merit Goods, and Normative Individualism, 2014). Even if this assumption holds democratic decision making over paternalistic interventions stays with the problem that a majority decides over means that usually do not find the consent among a minor part of the population, that nevertheless has to bear the costs. In the contract theoretical approach it should be decided behind a veil of ignorance in which areas decisions about paternalistic means should be made and how far they should go. Which rules then exactly would be decided is a matter of speculation, and even if done so in the constitutional economics approaches, in most cases such hypothetical situation is hardly to establish and at best partially (Kirchgässner, 2014). Regarding actual constitutional choices Buchanan acknowledges the little normative and explanatory significance of some hypothetical agreement under the ideal conditions of the Rawlsian veil by establishing a *veil of uncertainty,* whose "thickness" may vary (Buchanan, 1991, S. 56). However, the more transparent the veil, the weaker gets the argument of a reflective and rational individual choice in the political process, as "The restrictions on particular information in the original position are (…) of fundamental importance." (Rawls, 1971, S. 140). People who can accurately anticipate in which ways decided rules would directly affect them may tend to agree on rules, following biased preferences and we are not sure whether approvable means reflect "true" and non-biased preferences. Thus it is possible that "true" preferences are neither revealed nor expressed by affected individuals. "Evidence suggests that agents may not have "true" preferences at all. This, in itself, presents a problem for the new paternalist paradigm; we cannot claim to make people better according to their preferences if such preferences do not exist" (Rizzo & Whitman, 2009, p. 922). Libertarian paternalists assuming that true preferences exist, are still faced with the Hayekian knowledge problem about individual´s true preferences: "Does the paternalist know the true preferences better than the agent himself?" (Rizzo & Whitman, 2009, p. 922). The approach of libertarian paternalism does not yet offer an approach for the inquiry in individual preferences to identify the shape of long-term preferences.

Thus it does not provide a clear commitment to a welfare criterion, guiding a paternalistic policy-maker in choosing the "right" option in a choice frame. Thaler and Sunstein mention methods to seek indirect proxies for a welfare criterion, based on the outcome of majority choices. That goes in line with the contract theoretical model of an overlapping consensus to choose the right/rational option. However Rawls assumes individuals to choose a rational plan of life under hypothetical conditions of "deliberative rationality", where they have full knowledge about ones circumstances, capacities and interests (Freeman, 2016). The argumentation of libertarian paternalism however, sticks to behavioural findings and stresses on exactly the bounded rationality under which individuals do their choices (under uncertainty). Although they assume individuals to commit systematic blunders, Sunstein and Thaler are confident that a planner would choose the rational alternative, if this option would be either hypothetically or factually – "*as required active choice"* - approvable by majority (Sunstein & Thaler, 2003). Even if they offer proxies for approaches to identify correct options in a choice set, they do not give a normative criterion how to identify long-term preferences as a "rational plan of live" neither do they justify why they expect majority decisions to be right.

Libertarian paternalists assume that choices made by a majority converge to a rational decision independent of individual starting points, and thus that they are with a higher probability correct, than individual choices. Furthermore they assume, that often outstanding organisations do a better job in decision making as the individual itself, because organisations have the power to induce organized proceedings what makes them more efficient in aggregating and processing information (Kahneman, 2014; Vanberg V. J., 2014).

This reference to majority outcomes encourages considering the Condorcet Jury Theorem (CJT), as theoretical underpinning for information aggregation in the inquiry in individual preferences. The Condorcet Jury Theorem states, that any jury of odd numbers of jurors is more likely to select the correct option between two alternatives than any single juror, if voter have homogenous decision competences of more than one half and vote independently. This holds even if a single outstanding expert has more private information. The probability of being

correct increases in the number of jury members and converges to a probability of 1 in the end. If decision-making will be given over to a Condorcet jury, the theorem provides implications to face the knowledge problem of paternalistic policy measures i.e. to derive the correct option of a choice setting.

Furthermore relying on the CJT one can answer the question about *who* should be in the position to design choice frames. Proofing majority voting as an efficient mean for aggregating decentralized information in the quest for individual welfare the theorem provides with an expert-jury, a so called *Condorcet Jury* a wise paternalistic planner.

## 4. Implications for paternalistic climate-change-policies.

Applying the approach of soft-paternalism and its constitutional economics justification to the problem of global warming and a resulting desired goal to increase the market share of climate friendly LED bulbs, one can assume, that individuals are aware about environmental problems and would agree on the overrated long-term goal to reduce climate warming as well as on the (voluntary) self-binding to achieve the ecological long-term goal by supporting the purchase of climate-friendly products. As individual decisions involve costs, individuals typically routinize their day-to-day choices. They adopt a rule that dictates their behaviour for many single choices to reduce the costs of individual decision-making and will only invest in decision-making, since the marginal benefits exceeds the marginal costs (Buchanan & Tullock, 1999). Decision-making as a matter of routine may on the one hand minimize decision costs but on the other, involve the mentioned heuristics and biasing effects mentioned by behavioural economists that prevent individuals to decide rational according to their long-term goals.

Being aware about their bounded rationality and lack of willpower in (short-term) buying decisions, citizen are therefore expected to agree generally on constitutional level on nudging policies as a voluntary self-binding, to prevent

the risk of wrong decision making as well as to minimize costs of an individual "rational" decision. They delegate part of their decision competences to an outstanding authority that will be on post-constitutional level in charge to purposefully design choice sets so that individuals can follow in a routinized way the recommended option of the respective choice set. These nudges will affect individuals in the later process and are expected to help them to behave according to their self chosen long-term goal of sustainable consumption in their day-by-day buying and behaving decisions concerning the consumption of "light" In accordance to Buchanan´s calculus of consent collective choice is considered to be efficient, if people motivated by a "common good" decide unanimously on constitutional level to delegate parts of their decision competences to a political institution and how the respective institution should be designed and regulated, whereas on the post-constitutional level collective decision making will be carried out by majority decisions. In order to minimize individual decision-making costs as well the bargaining costs of collective choice, on post-constitutional level, the outstanding institution is empowered to help individuals to achieve their "common good", which is in our case the ecological long-term goal of energy efficiency. The institution would then be empowered to implement particular nudging policies that will steer individual choices towards LED consumption if they are affected by decision biases or lack of willpower. Nudges can be expected to decrease individual decision costs by implementing and fostering the routine for sustainable consumption pattern as well as to decrease the search and information costs for consumers regarding LED attributes and individual needs (i.e. light colours, lumen) via information provision and information architecture. The commitment to the delegation of these decision competences as well as the formation of "nudge units" would then be subject of a social contract, that defines pursued long-term goals and the design and regulation of such government intervention.

On constitutional level people decide behind a veil of uncertainty about rules regulations of the constitutional setting for the support of LEDs. This procedural approach meets the requirement for a fair social contract to respect the individuals as ultimate sovereigns. On post constitutional level however the

decision making underlies an outcome oriented process, namely the reliability of majority decisions being correct within a nudge unit and among large electorates. Constitutional risks and uncertainties that arise in an incomplete contract when the state of nature is realized must be inferred on the post constitutional stage (Jamil, 2011) by constraining a nudge unit and maximizing the probability of correct decision making and thus effective choice framing.[1]

Given there is consent among potentially affected citizen to delegate in the light of ill-formed or unstable preferences to decision competences to an outstanding organisation and referring to the Condorcet Jury Theorem as rational justification of soft paternalistic policies (Dold, 2016) and proof for majority decisions being more likely to be correct than individual decisions, decision-making is planned to be given over to an outstanding organisation like a Condorcet jury. Instead of one paternalistic planner, a Condorcet jury would decide about preferences and respective nudges relying on the majority outcome within the respective jury and minimize the danger of the knowledge problem. Thus the formation of an expert jury will increase the possibility of correct public decision making by keeping the costs of collective choice moderate. The optimal size of a Jury to minimize interdependencies of bargaining costs and correctness possibility of the jury depends on individual competences of the jury members and thus on the degree of information about consumer's true preferences. Meta preferences of individuals that are signalled to jury-members serve as a welfare criterion upon which a jury base its decisions about choice architecture. Jury members can observe signalled preferences of consumers and decide whether these are reflective preferences that will serve as a welfare criterion or not. If signalled preferences are in accordance to approvable long-term goals, a jury can base its decisions about choice architectures to improve consumers´ welfare on these meta-preferences and decide about appropriate policies.

[1] The analytical framework of a social contract that combines a procedural justification of paternalistic policies on constitutional level with an outcome oriented measure on the post constitutional stage will be elaborated in a separate paper.

# PART II THE CONDORCET JURY THEOREM AND DERIVABLE IMPLICATIONS FOR POLICY STRATEGIES FOR SOFT PATERNALISTIC IMPLEMENTATION OF LEDs

## 5. The reliability of the Condorcet Jury Theorem

However the Condorcet Jury Theorem itself - assuming homogenous and independent voters with individual probability of correctness of >0.5 in a binary choice underlies restrictive assumptions. In the theoretical framework the jury makes its decision under circumstances that are, similar to the veil of ignorance-model, far distant from realistic assumptions. The concept of real long-term preferences as welfare criterion raises the question about, *how* a Condorcet jury could absorb signals for advocated decisions, after all if revealed choices are partly biased. A generalization of the Condorcet Jury Theorem that transmits if from its pure analytical framework to more realistic circumstances and a deeper examination of how true preferences can be signalled to jurors is necessary to proof the applicability of the Condorcet Jury Theorem and offers implications for Jury implementation as efficient policy strategy for welfare inquiry to judge about choice architectures of consumers and to design an appropriate implementation strategy of LEDs.

## 6. The Extension of the Condorcet Jury Theorem

Regarding the underlying assumptions of the Condorcet Jury Theorem, one can stand that in its pure analytical framework, The CJT assumes a decision under similar hypothetic circumstances as the consent in the contract theoretical approach. However individual skills and information determining individual correctness-probabilities are not homogenous, such as shared information and unavoidable rhetorical or personal influence inevitably leads to correlation of voters, and after all choices are seldom binary. The applicability of the CJT as a theoretical underpinning and normative criterion for welfare inquiry and choice framing is given *only*, if the theorem still holds after relaxing its assumptions; i.e. after the suspension of homogeneity as well as (statistical) independency of voters, and after an extension to a choice set of more than two alternatives.

### Heterogeneous Jury Members

The assumption of homogeneity can be given up by an extension of the theorem to heterogeneous skills and information among jurors if at average the correctness-probability remains at leas at 0.5. If the outcome of the vote is known as well as the rule used by the group to reach its decision it is possible to derive proxies for individual competences that serve as a reference for choosing the optimal jury-size and decision rule to ensure a certain level of group-competence. Low individual competence can be compensated by a large jury-size, while high individual correctness-probabilities enable already small juries to reach a correct decision. To maximize the probability of a correct jury-decision in a heterogeneous group individual votes can be weighted such as the decision rule that maximizes the group´s probability of being correct is given by assigning weights to the jurors. Analytically based on a logarithm Grofman et. al. (1983) derives a theorem, where the weight assignment given to an individual depends exclusively on his competence independently of the competence of other group members. High individual competence enables already small juries with high individual weighting of votes to a maximal probability to decide correct (Grofman, Owen, & Feld, 1983). Thus the heterogeneity of individual skills and correctness-probabilities supports the idea of implementing small expert juries for optimizing decision-making

### A General Dependant Jury

The assumption of statistical independency requires that there will be no opinion leaders, that voters do neither communicate, nor possess common information or values, concerning culture, religion, beliefs etc. A relaxation if the independency-assumption leads to mixed results. In the case of negative correlation, nonmonotonic decision rule may lead to better results than simple or weighted majority voting. Therefore majority voting is not necessarily the optimal decision rule when jurors have identical competence (Berg, 1996). Marginal changes in correlation among voters may have only little effects on the collective probability for a correct outcome. However assuming positive

correlation the effectiveness of majority rule voting decreases with an increasing degree of positive correlation. Negative correlation that increases group competence can mitigate or eliminate those harmful effects of dependency by the statistical mechanism defined by CJT but in binary choices the correlation if it is negative will be small and decreasing in increasing jury size. Replacing independent variables by symmetric dependant variables in a correlated binomial distribution Berg (1996) produces the result that jury competence decreases linearly with the correlation. A moderate degree of individual competence and a high degree of positive correlation, leads to a group competence that may even fall beyond the individual competence of a juror. Thus the marginal utility of an additive jury member will even be negative (Berg, 1996) and the infallibility in the limit is not assured.

However assuming heterogeneous individual competences that vary across a jury according to a beta distribution, Berg (1996) shows that the first part of Condorcet Jury Theorem extends to this beta-binomial model and group competences indeed exceeds individual competence. To extend the second part of the Condorcet Jury Theorem to the beta-binomial case, correlation has to vanish quickly in increasing jury size. The Condorcet Jury Theorem holds assuming dependent voters if Juries are rather small with a high individual competence and/or there is only moderate degree of positive correlation. Berg (1996) concludes that generalizations of the Condorcet Jury Theorem taking it out of its small-group decision-making context, to justify majority voting as an efficient mean of aggregating decentralized information by collective decision-making represents an extension to environments that are far more complex (Berg, 1996). However in small expert-juries one may be confident reaching with high probability a correct decision even if there are interdependencies.

Dependencies among voters raise thus the question of the extent to which the conclusions of the Condorcet Jury Theorem continue to hold. Mc Lennan (1998) examines the Condorcet Jury Theorem when a game induced by the voting procedure is played rationally with the result that the profile of voting strategies constitutes a Nash equilibrium. He demonstrates that in a general setting there

are Nash equilibria that have the same properties as the implications of sincere voting described by the Condorcet Jury Theorem. By assuming that all individuals have the same preferences and the game induced by voting procedure is a game of common interest Mc Lennan proofs „[...] whenever sincere voting is a better aggregator, than individual dictatorship, an optimal strategy profile is both, at least as good and an equilibrium. In addition as the voters increases, optimal strategy profiles yield asymptotically perfect decisions [...]" (McLennan, 1998, p. 414). The implications of the Condorcet Jury Theorem still hold if individuals vote strategically according to a symmetric mixed strategy equilibrium of the game induced by voting procedure. Peleg and Zamir provide (2011) provide a sequence of a game that satisfies the Condorcet Jury Theorem and give the necessary conditions for its validity (Peleg & Zamir, 2012).

Concluding that even by assuming heterogeneity and dependency among voters both parts of the Condorcet Jury Theorem hold. Especially the relaxation of its assumptions allows the claim that already a small expert jury with high individual competence is very likely to choose correct between two alternatives. Pursuing common preferences and not exclusively individual interests against each other, a majority decision of a large assembly decides as well with a higher probability correct, than an individual. This probability with recourse to the game-theoretical findings of Mc Lennan (1998), Peleg and Zamir (2011) will asymptotically increase with an increase of group members. Thus the Condorcet Jury Theorem serves as a reliable mean to aggregate decentralized information by collective decision-making even in large assemblies.

However dependencies may lead to strategic voting, especially in the case when one´s vote is pivotal there are incentives to vote against private information but according to group-dynamic aspects that involve contrary information. Dependencies and strategic voting raise questions about the decision rule. As the Condorcet Jury Theorem only assumes naïve voters majority rule remains not necessarily as the optimal rule.

**Empirical Evidence – Challenging Majority Rule**

Important Juries often use the unanimous rule to optimize the decision outcome. However this perspective is based on the assumption of non-strategic voting.

Incentives for strategic voting in an unanimous juries are fairly high as every single vote is pivotal, which leads Feddersen and Pesendorfer (1998) to conclude that unanimity is an inferior decision rule because of the higher probability of strategic error. This probability of wrong individual decision however decreases with increasing jury member when applying majority rule (Feddersen & Pesendorfer, 1998). Coughlan allows communication among jury members and shows that if it is possible to have a straw poll before the final vote, there are informative and sincere equilibria, where voters reveal their information in the straw poll and vote optimally in the final vote (Coughlan, 2000). This type of voting eliminates the unattractive aspects of unanimity rule, with regard to strategic voting, and decisions under majority rule are expected to be identical to those in the non-strategic unanimity case (Guarnaschelli, McKelvey, & Palfrey, 2000).

Guarnaschelli et. al. (2000) provide empirical evidence running an experimental study to examine the variables of group size, decision rule and pre-vote deliberation. Voters received signals about the true state of the world and decided based on this private information. Votes based exclusively on private information showed evidence for strategic voting and resulting errors, in a 6-person group to a higher extend than in the 3-person group. In the case of a straw poll, jury members revealed their information and voted then optimally in the final vote. Shared information eliminated strategic voting in the unanimity vote, while under majority rule voters adapted strategically their vote to the outcome of the straw poll. Thus communication could mitigate the incentives to vote strategically in the unanimity case and created incentives to reflect about the private information under majority rule. In both cases errors were reduced (Guarnaschelli, McKelvey, & Palfrey, 2000). This evidence supports the idea of majority voting leading to correct decisions even under complete suspension of the independency assumption. In the case of a simultaneous game, errors decrease in size of the electorate and makes the theorem applicable even for large electorates (if voters pursue a common goal), while in the case of small jury the aggregation of information eliminates negative aspects of strategic voting under unanimity rule and creates incentives to reflect about private signals, which leads to equal and high jury competence independent of the decision rule.

### The Many-Option-Case

The Extension of the Condorcet Jury Theorem relaxing the assumptions of a homogeneous and independent jury members allows its extrapolation from juries to electorates, more generally. However the Condorcet Jury Theorem assumes a binary choice, which constitutes real limits on the theorem as most important decisions are not necessarily going to boil down on two options and people are not generally more than half-likely to choose the right option. An Extension of the Condorcet Jury Theorem to a plurality options case is possible with recourse to the Condorcetian pair wise comparison. The vote between more than two alternatives is then carried out by a pairwise decision between the alternatives, but the probability to choose the right option between each of those pairs still remains by more than 0.5. List and Goodin (2001) proof that the theorem still holds in the case of more than two alternatives when the individual correctness-probability falls below 0,5 in the many-option case, as long as individual probability to choose the right option is higher than the probabilities to choose any other option, even if more slowly this likelihood that the correct option will be the plurality winner increases in the size of the electorate (List & Goodin, 2001). List and Goodin challenge the plurality rule from the perspective of epistemic democracy, i.e. to examine whether plurality vote is a reliable truth tracker in the sense that the outcome reflects the preferences of the electorate. They compare plurality rule with other social decision rules, like the pairwise Condorcet, the Borda count, the Hare system and Combs system. By doing this they manifest that already at a size of 50 voters the outcome of a plurality vote is expected to be the epistemically desirable outcome and more sophisticated decision rules perform only marginally better (List & Goodin, 2001). Being a good truth-tracker from the epistemic perspective and straightforward to carry out, plurality votes among citizens, as electorates, will reliable reflect their preferences and serve as signals about true preferences to jurors in expert juries.

### Rousseau´s General will - Consensus beyond a "Natural State"

The CJT as a mean to develop a true common preferences supports the approach to identify and pursue common interests by voting. Grofman and Feld (1988) interpret the theorem, as analytical underpinning of Rousseau's theory of the *general will*. An understanding of the implications of the CJT enables to clarify and promote

Rousseau's confidence about the possibility to discern the general will by means of voting in an Assembly of the People. The basic Idea of Rousseau's notion of the general will is based on three substantial assumptions: 1) There is a common good, and 2) citizens do not always judge correctly about what this common good is, but 3) when citizen strive to identify this common good and vote in accordance with their perceptions of it, the vote in an Assembly of the People can be understood as most reliable means to ascertain the common good. Rousseau distinguishes between the "general will" and the "will of all" and describes the latter as a sum of particular private self-interests. People differ in individual self-interests and care about the protection and realization of these interests, but there exists a common social major interest that is approvable even when people decide according to private interests. People's judgements about what is in the public interest determines then social values, as a general will and individual self-interest will be cancelled out in the process of aggregation. CJT proves in an analytical manner that true social values and preferences can be determined by majority voting (Grofman & Feld, 1988). There is similar underlying basic idea of the contract theory of Rawls´ and the general will, but contrary to Rawls, Rousseau does not expect people to vote behind a "veil of ignorance" under ideal circumstances of in an abstract of a natural state but under "reasonable" circumstances that fit more with the model of the "humans" used in the libertarian paternalism. The general will therefore does not possess the absolute claim of infallibility but it is always upright and tends towards the public utility. Although deliberations of the people may have different rectitude, collective judgment is reliable to declare the general will if assembly members vote under reasonable conditions, i.e. informed, sincere, and without communication among themselves. Rousseau's notion of the general will provides a link to a regulatory concept, which considers entirely real circumstances. It provides beside the analytical, empirical and epistemical proofs of the implications of the Condorcet Jury Theorem, a justification to identify common values by majority voting from a social-democratic perspective.

## 7. The Condorcet Jury Theorem in Practise - Implications for a soft paternalistic implementation strategy of LEDs

The Condorcet Jury Theorem defends Libertarian Paternalism in different ways. On the one hand it can provide analytical arguments why people fail to achieve

long-term goals, namely if they are little competent, largely influenced and/or subject to contagion. On the other hand the Condorcet Jury Theorem defends choice architecture against the knowledge problem and the question *who* should be in the position to frame choice settings.

The delegation of decision-making to a Condorcet Jury translates the substantial criterion for nudging-policies´ efficiency – the voluntary approvability of the recommended choices – to the level of the paternalistic policy maker and heightens the libertarian spirit of the concept. Thaler and Sunstein imply that potentially approvable choices help individuals to avoid individual errors (Sunstein & Thaler, 2003), the CJT proofs that the approvability of choice frames within a jury results in correct choice architecture. Its applicability as normative criterion for guidelines that direct paternalistic policy maker, outside the restrictive analytical framework but under circumstances that fit to real life can be justified by relaxing the assumptions of homogeneity and independence among voter such as extending binary choice to a many-option case. Relaxing these assumptions, one can conclude that in the case of pursuing common interests, the Condorcet Jury Theorem even extends to large electorates and the plurality winner of a democratic vote constitutes a reliable truth-tracker of citizens´ true preferences.

What implications for carrying out choice framing architecture can we derive from these findings? First, the extension of the CJT provides a narrow definition in which situations the signals about true preferences directed to jury-members are expected to give correct information about individual preferences, namely when people share common interests and values, and goals refer to collective social welfare. Second, if common preferences are signalled by majority votes, the application of the CJT leads to a twofold safeguard against the knowledge problem on the level of citizen and on jury level we are assured to get the right outcome. This justifies the delegation of the deliberation process about correct choices and the decision-making to a Condorcet-jury.

Libertarian paternalists assume, that individual long-term and meta-preferences do exist but rather in an expressive form. Given a certain majority that expresses long-term values and signals these true preferences to a juror, then the outcome of a majority vote in a jury, where jurors reveal private information and vote than optimally can a) decide whether signalled preferences are indeed true or false, and b) which option within a choice setting would be the hypothetically approvable and thus the right one, and c) how this option should be recommended by a nudge like a starting points, a default option or other incentives mentioned by Thaler and Sunstein. Welfare judgements are then no more subject to biased individual choices, but to the deliberation process and the decision-making competence of a jury, whose expert-members distinguish themselves by high individual competence and maximize jury competence already at small jury size. Condorcet-juries then enable to run an effective strategy in order to boost social values and long-term goals without imposing taxes or bans on individuals.

True preferences can be observed either by referring to empirical studies and surveys as already mentioned by Thaler and Sunstein or they can be expressed by voting in opinion polls when people answer from a long-term perspective. This kind of "voting" applies directly to the notion of Rousseau's general will. True preferences however can also be expressed by consumers´ choices and explicit changes in individual work-, leisure- or especially consumption-behaviour. Consumers would then "vote by foot". These changes then are based upon an explicit and reflective decision against previous behavioural pattern and potentially signal true preferences, if explicit changes in individual behaviour are greatly appreciated, so that they find a strong and increasing consent among the population and may lead to behavioural turnarounds. In this case a subsidiary organisation and implementation of Condorcet-juries offers promising possibilities for the application of the Condorcet Jury Theorem and weaken the argument found in Rizza about missing local knowledge of a planner (Rizzo & Whitman, 2009, p. 905f). As local juries are close in touch with people they can examine rather quickly and in a differentiated manner whether collective changes introduce a behavioural turnaround a or not and examine if such a

paradigm shift of consumption behaviour involves a pareto-improvement. If there is a pareto-improvement to be expected, a citizen-friendly jury is able to decide optimally how to support in a well-directed manner welfare-enhancing behavioural trends and then derive choice frames to promote the desired option. A structure of implementing expert juries according to the subsidiary principle would enable them to catch and boost best possible the dynamics of new social values, whenever there occurs a pareto-efficient change of population's ideas and values. In particular the federal structure in Germany enables an implementation of juries with a subsidiary character to advance changes in trends that have emerged in the recent years, like trends towards consuming renewable energies, organic food, fair-trade as well as sustainable products or the support of local and regional agriculture and economy. The subsidiary degree determines to what extent a successful and differentiated inquiry in common preferences is feasible, to boost these preferences and respect at the same time the plurality and subjectivity of individual values.

Thaler and Sunstein already mentioned the successful effect to save energy and resources only through green default-options and information architecture, e.g. by informing consumers about the anonymous energy consumption of same-sized households in the neighbourhood on the energy consumption bill (Thaler & Sunstein, 2012). Energy supplier could set a green default option with the possibility to opt out to another tariff. The example of the community of Schönau in the Black Forest illustrates the power of default rules. The opt out rate of the green default to use other energy sources than the environmental-friendly energy of Schönau Power Company has been less than 1% in the recent years. Saving resources however can also be implemented by setting default options on the working place like printer settings from "print on a single-page" to "print on front-and-back (Sunstein & Reisch, 2014)". While "buying green" or in particular "buying organic" is often done for status reasons information provision like symbols e.g. a "fair-trade" or "organic" seal provides soft incentives. "Behaving green" however is less visible and due to automatic and rapid judgement, people often fail to pursue this social long-term goal, the concept of regional expert juries to design choice frames to use the large effect of

default rules offers promisingly possibilities to boost the transition in the use of energy.

## 8. A paternalistic implementation for LED bulbs

In the light of new challenges for environmental policies caused by climate change a paradigm shift of consumers´ behaviour towards the consumption of sustainable LED bulbs instead of the banned incandescent light bulbs or halogen bulbs offers a promising success in facing the climate change challenges. Assuming that there is a self-binding consent about the common long-term goal of saving energy to face the climatic heating, nudging policies to foster LED bulb acceptance among consumers offer a new perspective in environmental policies while retaining from bans and coercion.

Considering the consumption of sustainable LED bulbs, juries could optimally design nudging strategies with respective policies, taking into account that even if there exists the consent of energy-saving consumption, consumers often choose less expensive light bulbs than sustainable LED. Either they run an immediate cost-benefit analysis and suffer a hyperbolic discounting, or they are unaware about the particular attributes of LEDs (like amount of lumen or light-colour) their respective preferences and spare the search costs for their individual appropriate "good of light". A differentiated implementation of a jury would mean: one has to develop which expertise of jurors does best meet the respective target group of consumers. Private consumers, huge enterprises, factories where workers work night shifts or public institutions like schools or day-nurseries will have different preferences regarding light-colour, light-power (lumen) or quantities. Juries implemented close to respecting consumers can absorb signals about different preferences regarding the attributes of LED bulbs, the willingness to pay to pursue the long-term "sustainability- preference" and the intense of this preference. Observing different target groups a Condorcet jury are as well able to identify for which reasons some consumers might not follow these preferences. After a deliberation process within a Condorcet jury, experts decide about strategies to establish and boost preferences for sustainable lightning systems with aiming for example to an increase of the willingness to pay thanks to a deeper understanding of the value "sustainability", or by providing information about the different attributes of LEDs to minimize the search costs of uninformed consumers.

## 9. Conclusion

This paper argues that the character of consensus of libertarian paternalism justifies its profitability and implies reliability on majority votes. The Condorcet Jury Theorem provides an analytical approach to defend libertarian paternalism against the knowledge problem. Turning theory into reality, The Condorcet Jury Theorem is able to justify choice framing interference in individual decision-making referring to common values. This form of social nudging is promising in areas like consumer or environmental protection, social justice and sustainability in the use of resources, where individuals often fail to act according to long-term goals, due to cognitive shortcomings. However, interference in the purely individual lifestyle can only be justified if there are collective values to develop of how a "correct" life-balance should look like. Whether people should be nudged to "help" them facing self-control problems, which consequences has to bear only the individual himself e.g. by promoting healthy food or higher savings, depends if at all a collective moral concept about e.g. "a healthier-lifestyle" or "a sustainable retirement" exists, that still respects plurality and subjectivity of individual values. In this case the critics about a missing theoretical underpinning or a "Nanny-State" may be fair. Examining a soft paternalistic implementation of sustainable LEDs to face the challenge of climate warming I conclude: if and to which degree of interference into individual decisions and life-balance, a Condorcet jury will be a wise planner and able to derive common preferences and values depends on the subsidiary degree of jury-implementation. The more citizen-friendly choice framing and decision-making is delegated the closer to citizens everyday needs can choice frames be set. Referring to Rizzo (2009) who acknowledges: "Yet friends and family are more likely than policymakers to have the local knowledge necessary to make wise decisions" (Rizzo & Whitman, 2009, p. 924) In general and referring to the most famous examples of Sunstein and Thaler, a parent's or works council may debate about the arrangement of healthy and unhealthy food in the cafeteria or whether and how to implement saving plans. If necessary it can decide whether to help those who would be grateful for a nudge to resist certain temptations. Public institutions on higher institutional level however, should refrain doing so, as they cannot be assured to respect private subjective preferences. Regarding the pursuit of common long-term goals a so-called social nudging, in

particular the sustainable consumption of light and the increase of market acceptance of LED, the Condorcet Jury Theorem proofs that a Condorcet jury if implemented in a subsidiary manner can successfully identify and promote preferences for sustainable light consumption and respective LED attributes. The precision to observe and absorb signals of "true" preferences increases in the degree of the intensity the subsidiary principle will be applied. With regard to the implications of the Condorcet Jury Theorem, we can be confident about a Condorcet jury to select the right option in a choice setting based on signals of "true" preferences even outside the pure model-framework and under realistic assumptions. The approach to implement Condorcet juries in accordance with the subsidiary principle, allows to a large extend a precise inquiry in individual preferences and offers promisingly possibilities to apply (social) welfare-enhancing choice framing that respects subjectivity and plurality of individual values, within institutional frameworks that are citizen-friendly and close to affected people.

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