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REVIEW

Conceptual concerns hindering the research of weak signals and wild cards ahead of rural development planners

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ABSTRACT

The practical search for weak signals and wild cards does not follow the explosion of scenario building in public policy designing and policymaking practices. Potential rural development planners face a number of conceptual challenges when they engage in such research. The article takes stock of these theoretical points, which are hindering rural development use. The detection, speed, and impact of phenomena and preparation raise questions that have a decisive impact on the chosen research methodology. The article explores the need to increase the frequency of research and the follow-up activities of the foresight, as well as the subjective role of the researcher and interpreter, in the hope of inviting future studies researchers for further research and discussion.

Introduction and setting the scene

The current leadership of the Commission of the European Union, in line with similar activities of other international organizations, integration, major powers (Inayatullah 2013 37p), has prioritized long-term, strategic foresight[1] in policymaking, including regional and rural development policy, see the EU´s Better Regulation approach[2] including ex ante impact asssemnet requirement supported by foresight activities, the Long-term Vision for Rural Areas (2021). At the same time, looking at the foresights produced by the coevals, it appears immediately to the eye experienced in futures studies that trend[3] analysis and scenario building lack an important research tool, namely search for weaksignals and wild cards. Why is this? What are the obstacles to identifying weak signals for rural development planning and policy analyses? Which theoretical questions do not allow us to include such knowledge into public planning practices? In this article, I attempt to explore, list and present in a structured way he theoretical questions of examining these factors, which need to be answered with certainty if we want to make research on weak signals and wild cards an essential element of strategic, political and public

[1] https://ec.europa.eu/info/strategy/strategic-planning/strategic-foresight_en#latest

[2] https://commission.europa.eu/law/law-making-process/planning-and-proposing-law/better-regulation_en

[3] Not excluded, but including other relatives, but similar phenomena defined under another name.

planning and foresight. I will also illustrate the conceptual concerns with examples of rural development (separated by italic), my very own research field. A number of points listed below, if circumvented and overlooked, can lead to ad hoc results and random "hits" from research into phenomena.

Materials and Methods

Influenced by an interdisciplinary open discussion with both territorial planning theocraticals and future science lead scientist where the core questions were defined a systematic intellectual work has been started. In the first round, scoping interviews have been caried our to identify the basic categories and types of weak signals and their possible definition. Based on these, the second round, using text mining method and software[4], implemented the mapping of relevant literature for the literature review. Text mining steps already included weak signal, wide card etc. distinction in order to have the deepest possible pool of scientific literature. Theoretical questions and obstacles raised below are designed on the ground of the analysis and conceptualization work done by the author.

First of all, it should be noted that the theory of mainstream public planning supports and even expects long-term foresight (Lavallée 1972, p.135, Makridakis, S 1990 121. to 128p.), and so do territorial and rural development, so that weak signals and wild card research should be a relevant and expected activity in practice. Of course, at this point, we accept that futures studies are the external scope of planning (source) (otherwise we are looking for the future? Our aim could be to deliver information to public planning and decision-making, but without such a goal most research in this science would remain lart pour lart).

However, the concepts of weak signals and wild cards also raise a wide range of theoretical questions, which make it difficult to use them in the rural development planning system. According to the definition of a weak sign3, which is a phenomena difficult to recognise and therefore difficult to identify, the occurrence of which can hardly be inferred. It may indicate or facilitate a new trend. Thus, whatever form it may actually take, the question arises:How can 'Everything'be researched? And here we mean really everything. As Hiltunen (Hiltunen 2012 249 p.) indicates "Weak signals can be perceived through all five human senses:They can be seen, heard, smelled, felt or even tasted...." 'Further worsening the situation', Nonaka, H. Takeuchi (1995) concluded that weak signs may also appear in the form of tacit or explicit knowledge. A 'relative' phenomenon, similar to weak signals, is a wild card, which is an event with a low probability of occurrence but with a high impact[5] (Petersen 1999).

[4] NVivo Release 1.0 or NVivo 20

[5] Both phenomena have been defined at sea (Ansoff, Godet, Nováky, Hiltunen, Peterson, Van Notten et al, Rockfellow, Cornish etc.), but these can be seen as a type of synthesis.

Basic obstacles around the definistions

Looking critically at the first layer of definitions of weak signals and wild cards, the following theoretical questions may arise, which make their research more difficult, including by programming and mathematical means.

- Are they direct or indirect in terms of their effect? Can the statement, that the wild card is directly affects while the weak signal works indirectly, be justified? *Definitions are not helping us to answer, although our possible replay has elementary influence on choosing the method and scope, as going for indirect impacts broadening our scope and so task enormously.*

- For the period covered by the research, it is a big question whether the wild card suddenly emerges while the weak sign is "always in front of us" *(a sudden and dramatic drop in demand for agricultural products, for which there is already a human health policy "wish")?* Therefore, is it necessary to examine at a point in time or to examine a time interval? Due to rapidly changing complex systems, the latter is certainly the right solution, but due to the classification of the 'hit', of the search result (and thus the possible reaction), it is not all evident which we choose.

- It is also worth raising the very important question whether, if we find a weak signal, this makes by definition to lose its weak signal characteristic, as it becomes publicly known? (The wild card does not have such a "unknown" factor.) It seems essential to include in the formula a factor that takes into account the extent of the dissemination of the "news", the information. If this is limited, it may retain its weak character (*early rural awareness of a possible energy, water, food crisis*). On the other hand, in an increasingly 'perfectly informed' society (at least in quantitative terms) and its segments a phenomenon that becomes well-known in the public, may expel itself by a process described as 'market expectations' or society can be prepared for its suddenness and/or rapidity. In this context, the theoretical question which fundamentally determines the research focus is whether, if a phenomenon or factor would otherwise not be a weak sign, because it is known, is it easily recognizable, or do we give its weak signal characteristic when for other reasons, we do not deal with it? Can the nature of preparation be a principle of "weak signalness", and non-acceptance of a phenomenon can give its character (*possible global virus has been warned by specialists for a long time, but nevertheless suddenly and unprepared, for example, has it hit the education systems in rural areas in many countries, COVID-19 as a wild card?*)? Therefore, should the reaction on the subject phenomenon also be considered and evaluated? The response may obviously have a consequence that the

reaction we make needs to be studied and we need to extend significantly the focus and scope of the particular research. This reaction-dependent nature highlights the strong criticism of Inayatullah (Inayatullah 2013 41.p), which could also be discussed among the subjective elements, namely that public planning and so rural development specific language use ("Institutions create obscure language because that language serves particular interests.") and that the focus of investigations cannot be separated from the "client´s" and institutional interests which also determine the possible reactions ("how to make better policy or more future-oriented policy without investigating the political interests of certain policies is equally banal").

- It is also certain that the appearance of these phenomena depends on the place and time (at the right time and place) (Jørgensen 2012) but, if we dig deeper, then beyond objective environmental (nutrient) conditions, accidentally and subjective elements (e.g.extremities and serendipity, pseudoserendipity– Furstenberg 1990) also have a significant role to play. Concentrating and cumulative specialties and extremities at one point of the space may cause differences (*sudden local collapse may strengthen existing brain drain outmigration in the rural area*) on another point of the space. However, the territorial focus of research could also provide weak signals and wide cards, when looking for locally (here meaning on the target geographical level) unknown but in the external environment (*change of central national tax law*) existing and known factor. Here must be also mentioned the possible interactions with other (possibly weak and wild) factors which "appulse" can be also only once in the time and space.

- From the presence of suitable persons, to individual decisions, many factors can contribute to the emergence of weak signals and wild cards, and this is one of the reasons why it is really difficult to trace these phenomena, but this needs to be addressed in the focus choice. Most articles in the literature present a weak signal as an unprecedented sign (e.g. Mannermaa says: "Weak signals do not have any history and there is no time series that can be used as a basis for modelling..." Mannermaa in Kuosa, T. (2009)) but does this really apply? Where is the sprout? Is the examination of root causes part of the research? To what extent should its origin be tracked back? At Kim and Lee, the answer may appear in the concept of novel future signals (Kim, J., Lee, C. 2017 2p.), where only new phenomena are considered to be a weak signal. From the point of view of the methodology, it is not evident that we are looking for individual decisions, for example, or the resulted "physical" consequences of these individual decisions.

The next major package is structured around the effects of weak signals and wild cards. When looking at these phenomena we inevitably analyze also the impact as well, not least because the nature of the impact is an important building block in their definition (does it turn out to be a trend?) (will the soil-free", ultra-intensive, technology-based food production spread"?) However, many variants of the effects are conceivable and their (non) awareness may influence the outcome and the choice of the research methodology. In practice, this may mean, for example, that the non-recognition of an impact means that we do not choose a methodology properly and because of that, as a result, potential phenomena are lost.

Questions and critics related to the possible impacts

In addition to the basic variants of signals (small, large, strong, weak, etc.), the following impact mechanisms should be highlighted, which may lead to the recognition of the limitations of our research and assist in the choice of methodology:

- How does a given phenomenon affect a particular curve or trend (*the launch of a forced large-scale afforestation programmes with possible impacts on land use, CO2 capture, agricultural production, agricultural market prices etc.*)? Does it change the slope? Breaks or folds (can you turn back or redirect a tsunami? Dator 1994), repressive or amplifies other trends as multipliers? Does it change the slope´s form and direction? Should the ability to change the trend and the mechanism always be assessed?

- Is it easier to detect them in mono structures, while in complex systems (i.e. an object of public planning) it is more difficult? In the examination of complex systems, is simplification possible at all and if it´s so, how big the additional losses are (i.e. how many phenomena are excluded from this decision)? The latter may have a fundamental impact on the outcome, for example, when choosing to scan sectoral structures, rather than more complex focus areas.

- Does a weak signal or wild card automatically result bifurcation?

- Can weak signals or wild cards be combined? Can they reinforce or weaken each other (*the emergence of super-efficient forms of learning that spread in rural areas, or the social impact of eco-Gaia-based religious movements*)? How to search for frequent chain shocks, which may also be resulted by indirect causes and causations?

We do not receive an answer to these questions in their definition, but we have to deal with them when choosing the methodology.

In addition, the classification of impacts may cause methodological problems. We know that weak signals and wild cards can be constructive or deconstructive on the basis of their effects, i.e. they are fertile or harmless.

It is a big question whether this positive/negative effect is behaving on long term, or can change (*COVID-19 or other viral situations with similar effects on new normality as values and on urban-rural migration, reversing it in certain rural areas*)? Its often happens in times of change that the phenomena first "destroys" and then builds on it. How do we handle this when studying? Do we draw a balance, look at the balance between the damage caused ("number of victims") and the benefits granted? This is likely to become part of the researchers´ subjective decisions.

Also the date of the search cannot be incidental. If the environment changes that rapidly, weak signals and wild cards will also emerge more quickly? Do they also happen, produce their effects more faster and do the mechanism of these phenomena accelerate? Should the frequency of research/investigations be increased or we need to make more effort to conceptualize faster (JRC-EKLIPSE 2017 3)? If "everything" is more frequently researched, does it not lead to an amount of data that cannot be processed? For example, Kuosa says this: "environmental scanning is easy hindered by the problem of information overflow" (Kuosa 2009 42-45). Kim and Lee dissolve this with the concept of futuristic data (Kim, J., Lee, C. 2017 2p). It is also a practical methodological issue, but also an issue from the point of view of our definitions, how do we classify these phenomena as a weak signal or wild card. Do we have to wait for their impact or should we also foresight/prognose/assume it? The retrospective search would significantly reduce the helpfulness for planning. In the case of a phenomenon that we did not expect to be weak signal or wild card it´s easy to be smart ex-post, it is only worth to learn why we did not find it. However, in the opposite case, having had foreseen/predicted impact the monitoring and follow-up of the impact will give a huge additional task and workload. Do we stay by our original impact assessment on long term, or should it be up-dated, and also, do the phenomenon remain in the category of weak signals or wild cards?

In addition, the assessment of impacts, the evaluation and possible pre-estimation opens the next questions, namely the measurability of weak signals or wild cards. Although Anschof, the great predecessor, stated that the effect of a weak sign cannot be specified (Anschof 1984), the two definitions do not provide precise guidance on measurability, nor does it exclude it; however, if something can be measured, it should be predictable at least by a more primordial device or by extrapolation. It seems that the phenomena themselves are difficult to predict (contrary to their definition, but the predicted weak signal or wild card for planning would be the "primary prize"), but their effects are more easy to predict. If a sufficient number of measurement points can be identified (from the perspective of the future science scientist possibly sadly for the rural development planner too many?), then the weak signal may lose its character, but it should be attached here again to the question of the fundamental importance of the response concerned.

Time factors and possible methods

To what and how do we research is depend on the information available, but another question is that we can only search for "existing" information[6]?The classic argument of "futures studies-sceptics" is that future is not possible to studied (yet). But, of course, we have the response to this, as not just existing phenomena are to be researched, as we can also examine ranges of options and, in the case of weak signals, we can finally look at on existing "starts", sprouts. A number of tools have[7] been developed through environmental scanning, scenario building, the filters of Ansoff (1975-1985), Causal Layered Analysis (CLA) by Inayatullah, (Inayatullah 2004), risk analysis, etc., which, supported by participatory methods (Delphi, expert interviewing, etc.), are suitable for exploring opportunities and win information, but also an absorbent (rural) development planning (Szabó 2015) is needed to use these. However, by including ranges of options, practitioners engaged in searching for a weak signal or a wild card will have to extend the focus of the search again to cover possible phenomena (without regard to probability?). Many authors argue in favour of a number of methods. In the field of qualitative methods (Hiltunen 2011) would reveal phenomena by using interviews conducted in a peer group. In quantitative research, big data and small data studies may already be considered (in addition to probability values?).

It is also clear from the literature that the so-called 'thinking out of the box' is necessary to find weak signals and wild cards (and their ranges of impacts) (and, according to M. Barber, wild cards widen the vision). However, attention should be drawn here to a delicate balance linked to participatory procedures. Indeed, it is also agreed upon that participation procedures may extend the scope of information on possible phenomena. Hiltunen wonders how to eliminate the[8] cultural/subiquent distortive effect of the interpreter (Hiltunen 2007 254 p.), but it may also be raised the question, how it is possible to leave the normal sphere of thought without this subjective effect? Choo already pushed the envelope on this point when he writes: "Scanning or browsing behavior is influenced by external factors as... and personal factors such as the scanner's knowledge and cognitive style" (Choo 2002 97.p.) (*example from a particularly text-oriented areas such as a sudden spiraling urban-rural political conflict or the emergence of a bottom-up rural political party*). If we refer now to a previous point and we look at the fact

[6] The availability of data is again a different layer here, but this concerns mainly all scientific works, there are very few research which are not hindered by this.

[7] Rossel gives an excellent summary of treatment systems beyond Anschoft in six points (Rossel 2012, p 232-233).

[8] "The interpretation: The receiver's understanding of the future sign's meaning."Hiltunen 2007

that weak signals can came from a source of tacit knowledge[9], we can acknowledge that we can face a very sensitive dilemma on subjectivity, which needs to be resolved by the methodology.

Figure 1 attempt to outline the relationship between shrinking information, the 'thinking out of the box' and weak signals and wild cards. The bottom and the upper set shown in the image presents the ranges of options for which we have the least information, where there is the greatest need for participation and thinking different from usual.

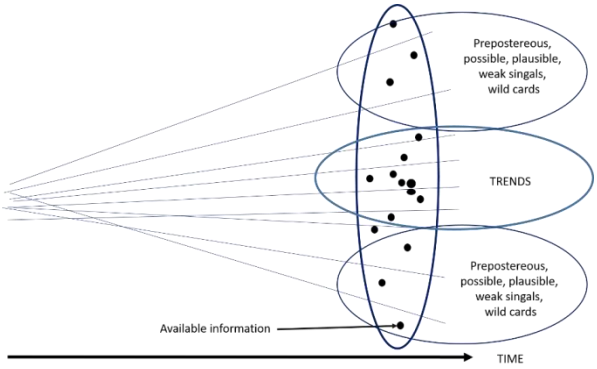

Figure 1. Introduction of weak signals and wild cards in the future cone. (Source: Adapted from Voros (2003, 2017), which was based on Hancock and Bezold (1994)),

If it is true that for a worth case scenario, or even for an utopist scenario, it is necessary to imagine the "unimaginable" weak signals and wild cards (*unlimited, fusion energy production may have an impact on rural areas focusing on renewable energy production; the total penetration of virtual tourism which set back rural tourism*), even only for putting scenarios under pressure (JRC-EKLIPSE 2017 9) and under critical loupe, then–returning here to the previous question about the subjectivity–doubts may arise about the use of IT tools. Do IT tools have imagination, can we program imagination in software, or can we only filter the screening with a low probability values? Will AI change this? If so, we can rely with greater confidence on mechanical, big and small data (also "data about data" (Glassey 2012)) or text mining methods (more and more experts and scientist tending to use these methods (in Tabatabaei, Decker et al, Eckhoff et al etc.).

Moreover, the most basic type of text mining methods, searching for words, are immediately got excluded from our available research methods, since if we know what we are looking for, then this is by definition not a weak signal or wild card (independently from this, the resulting information may still be important for planning). Thorleuchter and Van den Poel (2013a) suggest to use semantic clustering by searching texts for weak signals, which method may be suitable for analyzing texts written by different people in different styles and language. Choo, in his work already referred to above, also relies heavily on printed, textual information sources (Choo 2002 p. 157 p.[10]), listing also both external and internal organizational knowledge, but their combined use presupposes the use of mixed methods–qualitative and quantitative–which, taken together, may be highly resource-intensive.

In the case of research methods based on personal interviews described by Choo and others (referring again to the dilemma related to the interpreter), it is important to see that from Ansoff (1985) we know, that interviewee needs to have creativity, but also, according to Mendonça et al. (2004), environmental turbulence and noise (Haeckel 2004) should be recognized as the first sign of a researched phenomenon. A big question is whether the interviewee, the intermediary, the researcher itself and other participants do have the soft skills (Saul 2006) to fulfill these expectations and/or can they be prepared for this task[11]?

Summary

From a practical, rural development planning perspective and looking at the phenomena of weak signals and wild cards with a constructive approach, it should be noted that a number of questions have to be addressed to achieve greater use in public planning and policy. In the article, we covered the most important dilemmas, grouped around impacts, time factors and possible methodologies.

It has been demonstrated that practical rural development research is challenged by the question of calibrating research into a time or a period of time, but also whether, in an era of accelerating change, the frequency of the emergence of the phenomena is increasing. This latter point lead us to raise the question of whether we should also make our research more frequent.

In terms of impacts, we also seem to be confronted with a number of dilemmas. We need to be able to answer first of all the question whether we are waiting for their impact to occur by assessing the phenomena? Not only can the definition be justified, but it may also be necessary because, as we have shown, the reaction concerned has a decisive influence (the publicity, the preparation, the handling can deny to be a weak signal or wild card), but if we do not wait the impact to be "realized" it can in advance deliver more useful information to rural development planning. However, if we do not wait the impact to be happened and we estimate it in advance, then the follow-up will ask for additional tasks. Moreover, in the case of complex systems examined, some of the impacts and consequences have non-permanent characteristics in the long term, may be deconstructive, then constructive or

[9] Kaivo-oja (2012) deals with knowledge management theories and weak signals for a long time.

[10] In addition to extending the quote in the table to "online databases and CD-ROMs" to today's devices (e.g. clouds)

[11] However, this is specifically stated by Koivisto, R., Kulmala, I., Gotcheva, N. (2016 181 p.).

vice versa, thus assigning a monitoring task on the researcher.

The methodology to be chosen includes how long we go (back) by looking for sprouts and starting points of weak signals and wild cards? In terms of methodology, it is not evident that we are looking for individual (conscious?) decisions or the consequents (already more sophisticated phenomena, e.g. a patent, an initial movement,etc.). In addition, the available methodologies have uncertainties in coded. If it is a quantitative method, what probability will it look for and what is ignored when setting this threshold? Does the selected software have an imagination to "leave the box"? Qualitative research involves the role (prepared or unprepared) and impact of the interpreter, which seems to be in line with the need to be able to think out of the box and to recognize phenomena that are difficult to recognize or with a very low probability.

Thanks Professors Erzsébet Nováky and Attila Korompai for our infinitely exciting conversations at all times, but especially for the inspirational conversation that took place during our joint journey in autumn 2018 (can been seen as weak signal?), when we driven to Pécs in three to take part in one of the celebrations of the 50th Anniversary of Hungarian Foresight Research.

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