Name of the indicator/method:

**Time Distance Method for Analysing and Presenting Indicators**

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**Description**

Time distance is not an indicator in the narrow interpretation but rather a method for analysing and presenting many indicators.

**Why we need the time distance method for analysing and presenting indicators**

The time distance methodology offers a very interesting new way of analyzing and presenting indicators and time series data in general. Well-being and development are multidimensional and long-term phenomena, people compare and assess over many dimensions and over time. Time, besides money, is one of the most important reference frameworks in a modern society. The time perspective, which no doubt exists in human perception when comparing different situations, has been with the S-time-distance method systematically introduced both as a concept and as a quantifiable generic statistical measure.

- *The new generic time distance approach offers a new view of existing data that is exceptionally easy to understand and communicate, and it allows for developing and exploring new hypotheses and perspectives.*
- *It can also make important contribution to better exploitation of information resources in new ways and to the visualization of findings; it is also well placed to be used jointly with other methods.*
- *Expressed in time units it is an excellent presentation tool easily understood by policy makers, experts, managers, media and general public, it can support decision-making as well as influence public opinion.*

**Definition of S-time-distance and policy implications: different statistical measures may lead to different perceptions about the situation**
Statistical measure S-time-distance measures the distance (proximity) in time between the points in time when the two series compared reach a specified level of the indicator X. The observed distance in time (the number of years, quarters, months, etc.) for given levels of the indicator is used as a temporal measure of disparity between the two series, in the same way that the observed difference (absolute or relative) at a given point in time is used as a static measure of disparity.

S-time-distance measure is a measure with clear interpretability that delivers a broader concept to look at data and to compare situations, including benchmarking and monitoring. This innovation opens the possibility for simultaneous two-dimensional comparisons of time series data: vertically (standard measures of static difference) as well as horizontally (Sicherl time distance). In graphical terms, the usual way is to compare the time series in the **vertical dimension**, i.e. for a given point in time. The time distance approach uses an additional perspective; it compares the respective time series in the **horizontal dimension**, i.e. for a given level of the variable. Empirically, the degree of disparity may be very different in static terms and in time distance, which leads to important technical and policy consequences.

**Where to use the indicator**

We shall present two examples of usage of the method: comparing units (benchmarking) and monitoring implementation of targets.

**Benchmarking and gap analysis**

Two time series can and should be compared in two dimensions:

1. **static gap for a given point in time**
2. **gap in time for a given level of the variable**

Figure above is a schematic example of the time series comparison in the two dimension. For instance in 2008 static index 138 shows the static gap, the time gap of 17 years gives a different additional perception of reality. For a broader more realistic picture we need to consider both dimensions simultaneously.

Comparing the EU15 for male-female differences in life expectancy in 2000 the female life expectancy was 6.3 years higher (absolute static difference), which amounted to about 8 percent difference (relative static difference) in relation to that of men. However, the S-time-distance was an astonishing 29 years. This
means that women attained the value of male life expectancy for 2000 already in 1971, about three decades ago. The perception whether the gender difference in life expectancy in the EU15 is large or small depends on the measure used: static percentage difference is only 8 percent, while S-time-distance amounts to 29 years. Measures of both dimensions are statistical measures based on past development, both are valid simultaneously.

This is important for analysis and policy debate for a single indicator and especially for comparisons across indicators with different growth rates in different fields of concern as needed for the Beyond GDP approach. The better the analytical framework the greater the information content provided to decision makers, experts, media and general public. If one does not use explicitly the broader framework outlined here, there is a possibility that in political debate and policy formulation various interest groups would intentionally look only at the measure which will suit their particular interest.

Monitoring and evaluation – how to present it better for public debate

A substantial effort of the international and national organizations as well as research organizations has been and will be channeled into collecting and analyzing the necessary data for the systems of indicators under discussion. However, the benefit for better decision making and wide participation of broad range of stakeholders will depend critically on the human interface: understanding of the information and communication of that understanding (Sicherl, 2006b). Monitoring and evaluation of the degree of implementation of policy targets are indispensable phases of the policy circle. The interpretation of the deviation of actual development from the line to target with S-time-distance measure is straightforward and intuitively understandable; it deals with lead or lag against their own target. It is like tracking the actual arrivals in comparison with the train or bus timetable, the difference being that the concept of geographical space is in our application replaced with the indicator space.

With EUROSTAT we agreed on a selection of sustainable development indicators to be tested using the time distance methodology. In a single table there is a wealth of clear information about being on or off the track to targets for 12 selected indicators from 7 themes of SDI for all years.

People will intuitively understand the time lead or time delay of actual implementation against the assumed time table to the proclaimed targets.

This type of analysis can be repeated in the EU case for all 27 countries across a selected number of available indicators with established targets. In the case shown it is easy to observe the large delays in the theme 6 Climate change and energy; and in the road share of inland freight transport and share of R&D in GDP.
The above analysis for one unit across many indicators can be also performed for a given indicator across many countries or regions or socio-economic groups. Tracking the time table to Lisbon for total employment rate is here shown against the EU overall target, for NRPs the individual country targets for indicators will be taken into account.
If the relevant EU and national bodies would care to assess the S-time-distance measure by the same eight criteria applied to the selection of structural indicators like 1. Easy to understand, 2. Policy relevant, 3. Mutually consistent, ... 6. Comparable between countries, etc. (Munoz 2004), then for this application in monitoring implementation of the Lisbon EU and NRP strategies by structural indicators as well as for sustainable development strategies the S-time-distance measure would pass the test with flying colours.

**Challenges and limitations**

The strength of the S-time-distance concept lies in the fact that it enables additional exploitation of data and visualization for time related databases and indicator systems. The present state-of-the-art neglects this additional information available in time series databases and thus leads to an information loss that has no justification. The results and conclusions based on the two-dimensional analysis, static measures and time distance, can provide a new dimension and new insights, while none of the earlier results are lost or replaced. Another technical and presentation advantage is that time and time distance is comparable across variables, fields of concern, and units of comparison. This makes it an excellent analytical presentation and communication tool.

Since S-time-distance and S-time-step are expressed in time units, they are intuitively understood by policymakers, professionals, managers, media and the general public and help them in better understanding of the situation to form their subjective perception. Time distance and time step bring new semantics to policy debate and management decisions. Using these expressions in social, business and technical contexts S-time-distance and S-time-step can be a presentation and communication tool useful to different levels of decision makers and interest groups in describing the situations, challenges and scenarios, for proactive discussion and presentation of policy and business alternatives to decision makers, media, the general public and mobilizing those participating in or being affected by the programs.

One of the possible weaknesses of the method is that calculating the times by interpolations may pose a problem in achieving accuracy of the level of the original data but it provides additional understanding about time dimension of disparities and is the basis for a good summary overview. Also, for the specified levels we may not get any intersection, or we get more intersections in case of series with changing directions, so one has to decide which one to take into account (first intersection, last, etc.). In the empirical examples here we take the last intersection.

At present we are dealing mostly with the points related to improved broader perception of the situation: description, multidimensional comparison and evaluation, presentation, visualization and semantics for policy and management. One can expect also more applications in the business and monitoring.

**Links to additional information**