Assessing Structure from Process: The Actor-Process-Event Scheme (APES)

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Abstract

In this paper, we present the current version of the APES software application, discuss its conceptualization as well as its features and point out possible applications. The software is now available as a user friendly java application from our website (www.apes-tool.ch).
The main objective of the APES software is to facilitate the use of social network concepts to social science researchers without much methodological background knowledge. The application allows the researcher to store and graphically display process data (event participation of actors) which can also be rendered as a jpg image and saved in xml. Furthermore, the two-mode process data can be transformed into a one-mode network which are then displayed in the form of a target diagram. Basic indicators complement the application.
We will demonstrate the use of this tool for comparative case studies in the field of political science by applying it to cases from our own research.

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1 Introduction

In this paper we try to overcome the difficulties for political scientists usually applying a narrative, process-oriented case study approach to integrate the concept of policy networks as one variable among others to a set of hypotheses. Over the last two decades the concept of policy networks has gained of both importance and acceptance in political science. For this purpose, we propose that out of well documented case studies about the political process one can develop the structural configuration of political actors in the sense of a policy network by applying some rather simple transformations to an Actor-Process-Event Scheme (APES) (Serdült et al. 2005). Through the obtained data not only conclusions on the structure of a single policy process can be drawn, but the comparison and benchmarking of qualitative policy processes becomes possible.

Our paper will first discuss the current version of the APES software application by presenting its features conceptualized as a step-by-step manual. The use of APES in the field of comparative case studies will then be demonstrated with case studies from our own research.

2 The Actor-Process-Event Scheme (APES)[1]

2.1 Conceptual Background

We assume that it is possible to derive a structure – understood as relations between nodes – from process. Every process, conceptualized as a sequence of linked events, contains the information necessary to derive an underlying structure. In Social Network Analysis (SNA) there are many applications based on this idea under the name of *affiliation networks* or *actor-*

[1] The Actor-Process-Event Scheme in its current version was developed within the NRP42 research project and is also based on work of team members Ulrich Klöti (1984), Thomas Widmer, as well as previous research within other projects, especially see Buser (1984).

event networks (Wasserman/Faust 1995: 291ff.; Jansen 2003: 102). APES does standardize qualitative case study data by visualizing public policy processes within a particular political system. By doing so, it gets not only possible to compare different cases on a more generalized level, but qualitative data can be converted into quantitative data, and used for further research. Like this, APES closes the gap between qualitative and quantitative procedures by embracing both qualitative case study designs and SNA.

For our purposes, we propose that participation of political actors in an event of the decision-making process are sufficient indicators in order to operationalize the structure of a decision-making process in the sense of a policy network. In more practical terms, for each policy process it is necessary to systematically extract information on a) political actors, b) procedural links, and c) events for designing an APES. By agreeing in advance on the events of a decision-making process (defined by institutional characteristics and the rules of the political system under study) and the political actors or groups of political actors (such as: the executive, public administration, interest organizations etc.), a descriptive case study can be transformed into an APES in which the political actors interact by event participation and procedural (institutional) linkages.

In order to then "translate" this qualitative case study data into quantifiable data, APES generates two distinct data matrices for every scheme. A scheme can therefore either be exported as a two-mode actor–event matrix, or as a one-mode actor-actor matrix and can again imported into software packages such as Ucinet (Borgatti et al. 2002) and others.

2.2 APES Software Application

In its current version, APES is conceptualized as user friendly stand-alone java application. This chapter is structured as a step-by-step manual, in order to present the

available features provided by APES. The following steps are being discussed within this chapter:

Step 1: APES Download
Step 2: Create a new scheme
Step 3: Create actor group/ actors
Step 4: Create phase/ events
Step 5: Create relations
Step 6: Edit actor relation types
Step 7: Hide/ aggregate data
Step 8: APES Descriptives
Step 9: Save a scheme
Step 10: Visualize Network
Step 11: Export and import files from/ to other software applications

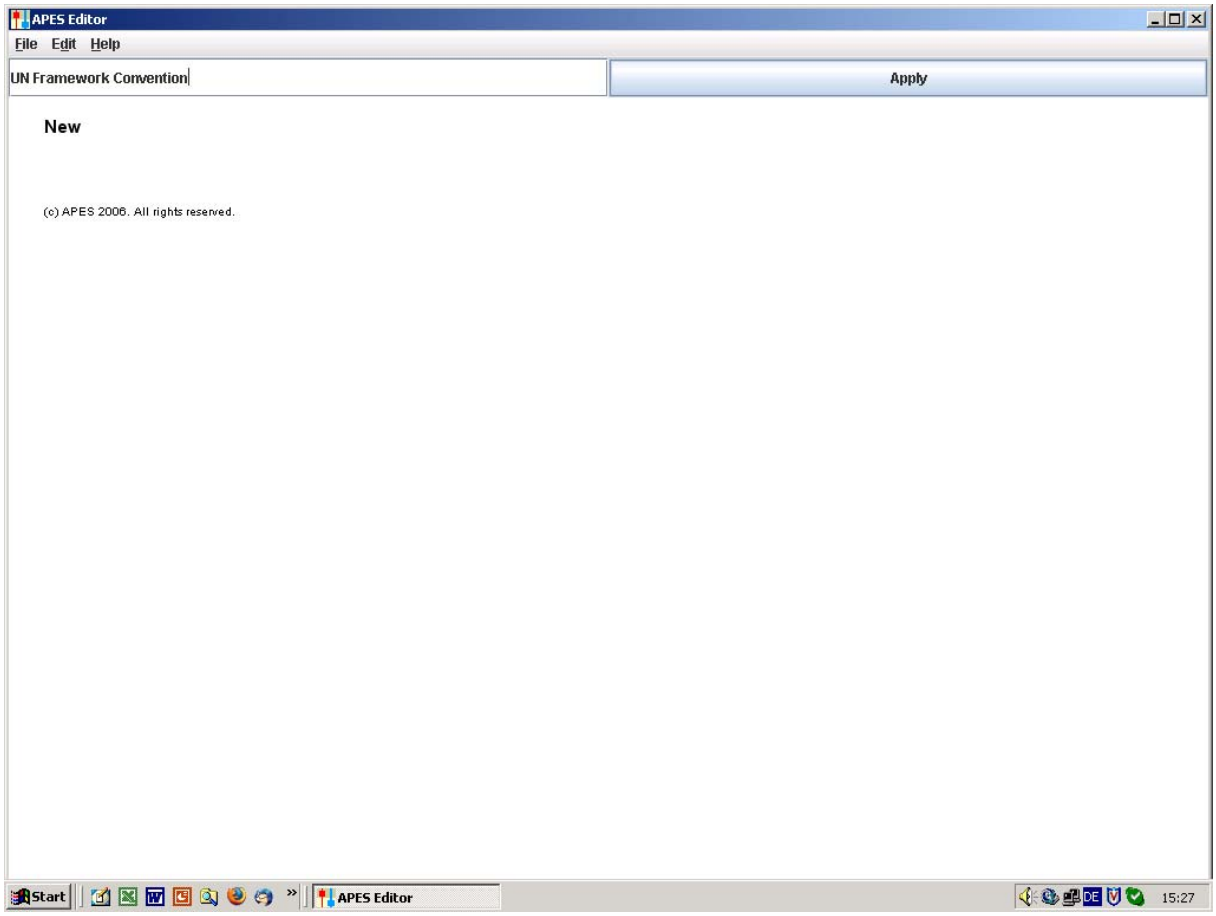
Step 1: APES Download

The APES download is free for non-commercial use. APES can be downloaded from the APES webpage (www.apes-tool.ch). The APES download is available to users running Linux/Unix/Mac OS X and Windows. APES runs on a Java Runtime Environment (JRE), minimum version 1.5.

Step 2: Create a new scheme

1. Open APES Tool.
2. Go to “File” -> Choose “new” for creating a new scheme (choose “open” for opening other APES-files).
3. Go to “Edit” -> Choose “Edit Title” -> Enter title of your scheme into the corresponding array -> Press “Apply” (see table 2.1).

Table 2.1 Create a new scheme

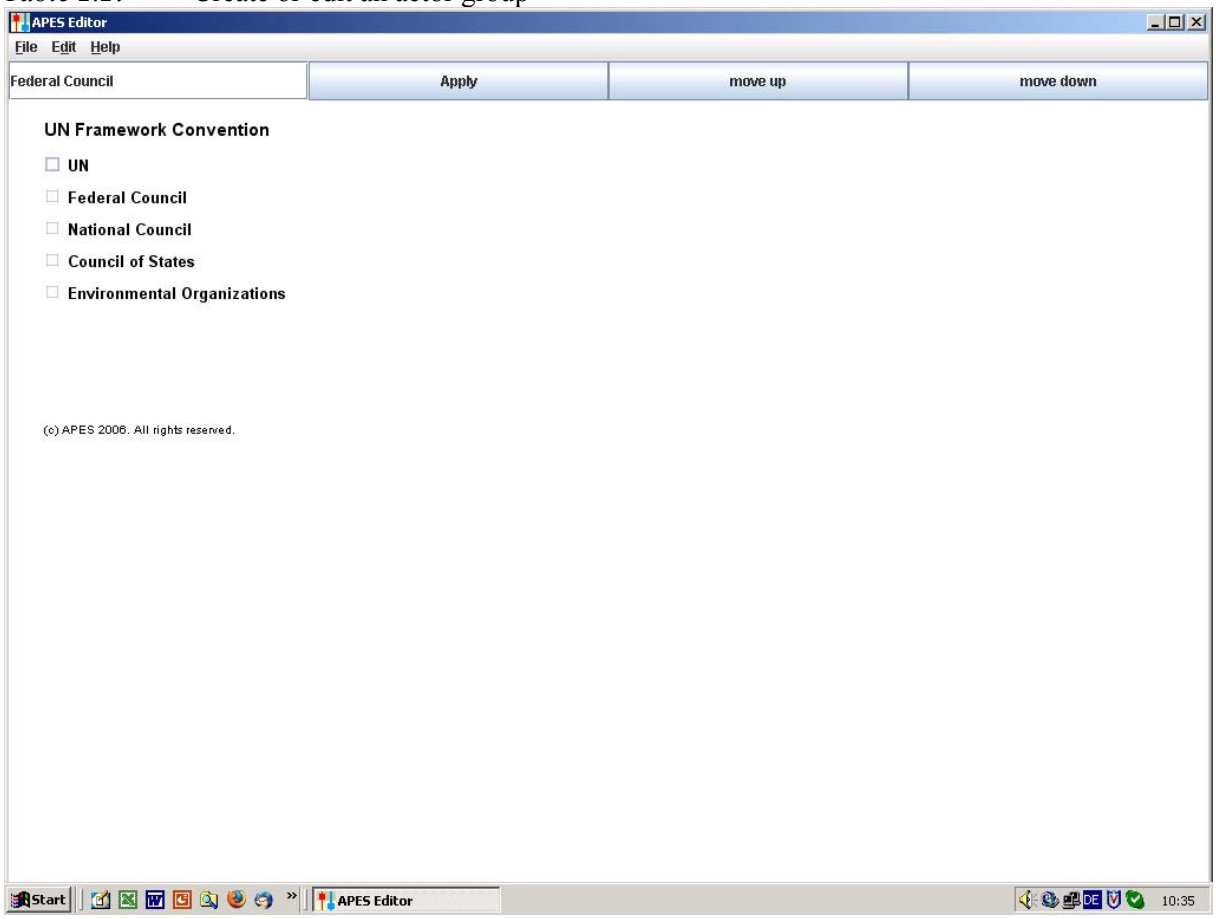


Step 3: Create actor group/ actors

A. Create an actor group

1. Go to “Edit” -> Choose “Add a new actor group” -> Enter name of your first actor group into the corresponding array -> Press “Add”.
2. For any additional actor group, repeat this procedure as often as necessary.
3. For editing the label or the order of any actor group within the scheme, put the cursor on the small box placed left of each actor group label -> Make a right-click on your mouse; a window appears -> Within this window, choose the option “Edit” and alter your data entry for this particular actor group or change the order of the actor group by pressing either “move up” or “move down” -> Confirm by pressing “Apply” (see table 2.2).

Table 2.2: Create or edit an actor group

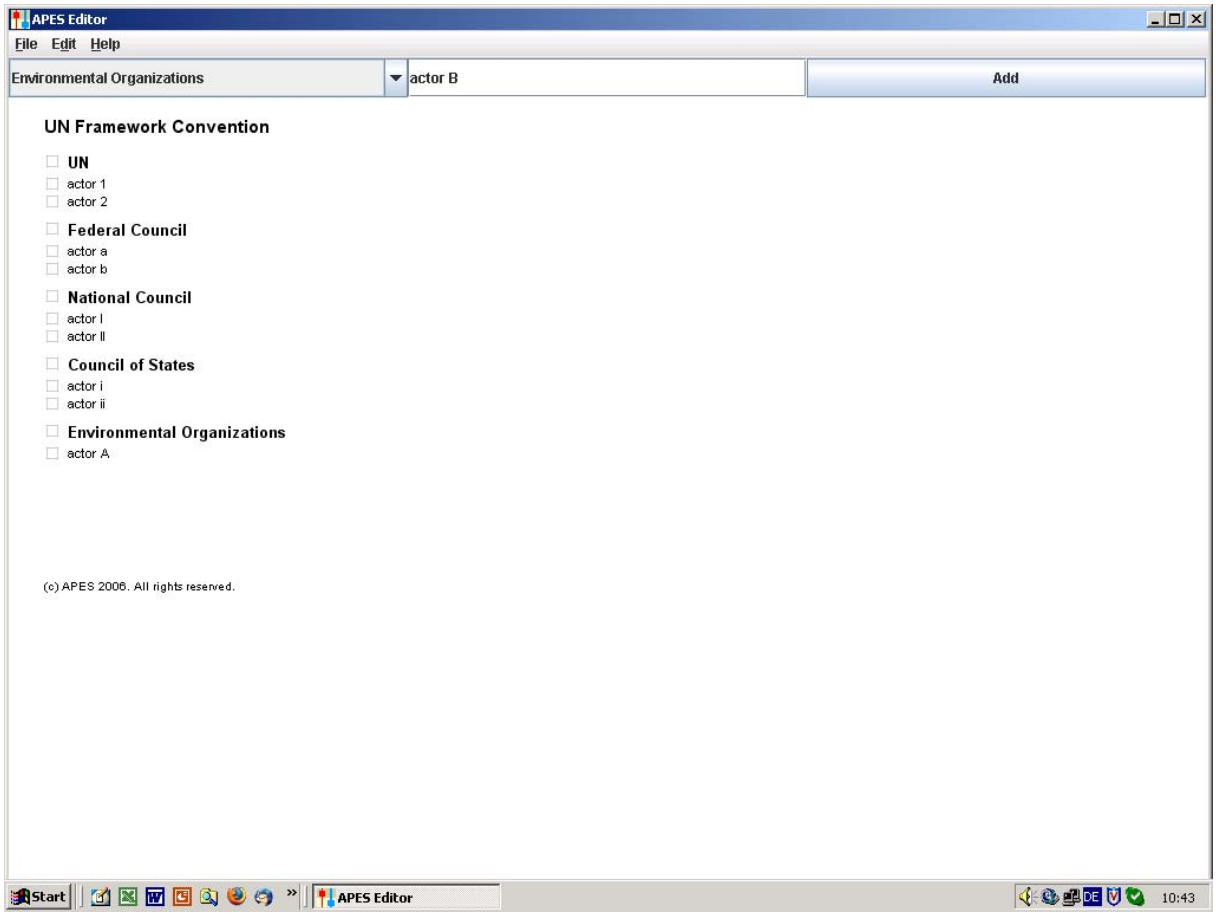


B. Create actors

1. Go to "Edit" -> Choose "Add new actor" -> Choose first the actor group in which the corresponding actor is to be placed -> Enter then the name of the new actor into the corresponding array -> Press "Add".
2. For any additional actor, repeat this procedure as often as necessary. *Do not forget to always choose the correct actor group in which the corresponding actor is to be placed.*
3. For editing the label or the order of any actor within the scheme, put the cursor on the small box placed left of each actor label -> Make a right-click on your mouse; a window appears -> Within this window, choose the option "Edit" and alter your data entry for this particular actor or change the order of the actor within his actor group by

pressing either “move up” or “move down” -> Confirm by pressing “Apply” (see table 2.3).

Table 2.3 Create or edit an actor



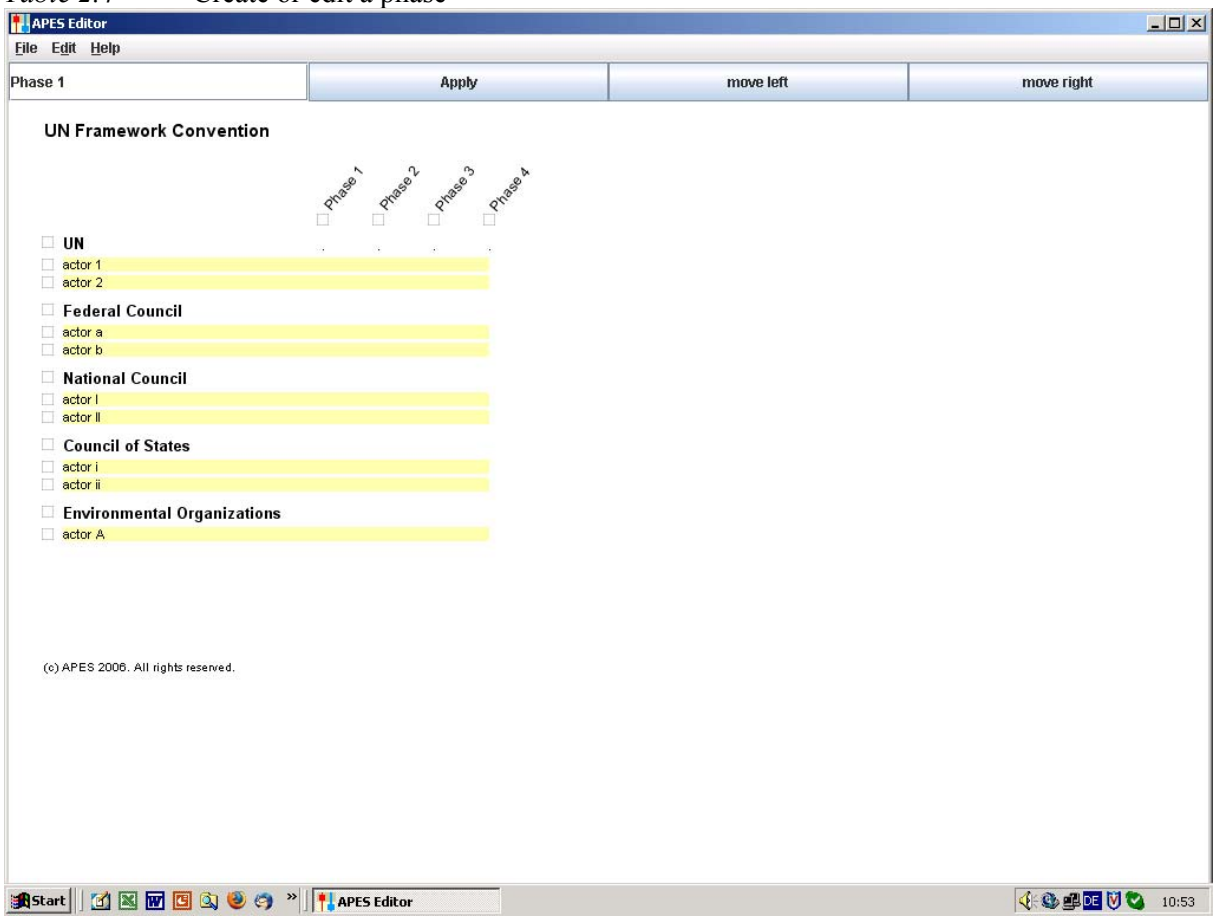
Step 4: Create phase/ events

A. Create a phase

1. Go to “Edit” -> Choose “Add a new phase” -> Enter name of your first phase into the corresponding array -> Press “Add”.
2. For any additional phase, repeat this procedure as often as necessary.
3. For editing the label or the order of any phase, put the cursor on the small box placed below each phase label -> Make a right-click on your mouse; a window appears -> Within this window, choose “Edit” and alter your data entry for this particular phase or

change the order of the phase by pressing either “move left” or “move right” -> Confirm by pressing “Apply” (see table 2.4).

Table 2.4 Create or edit a phase



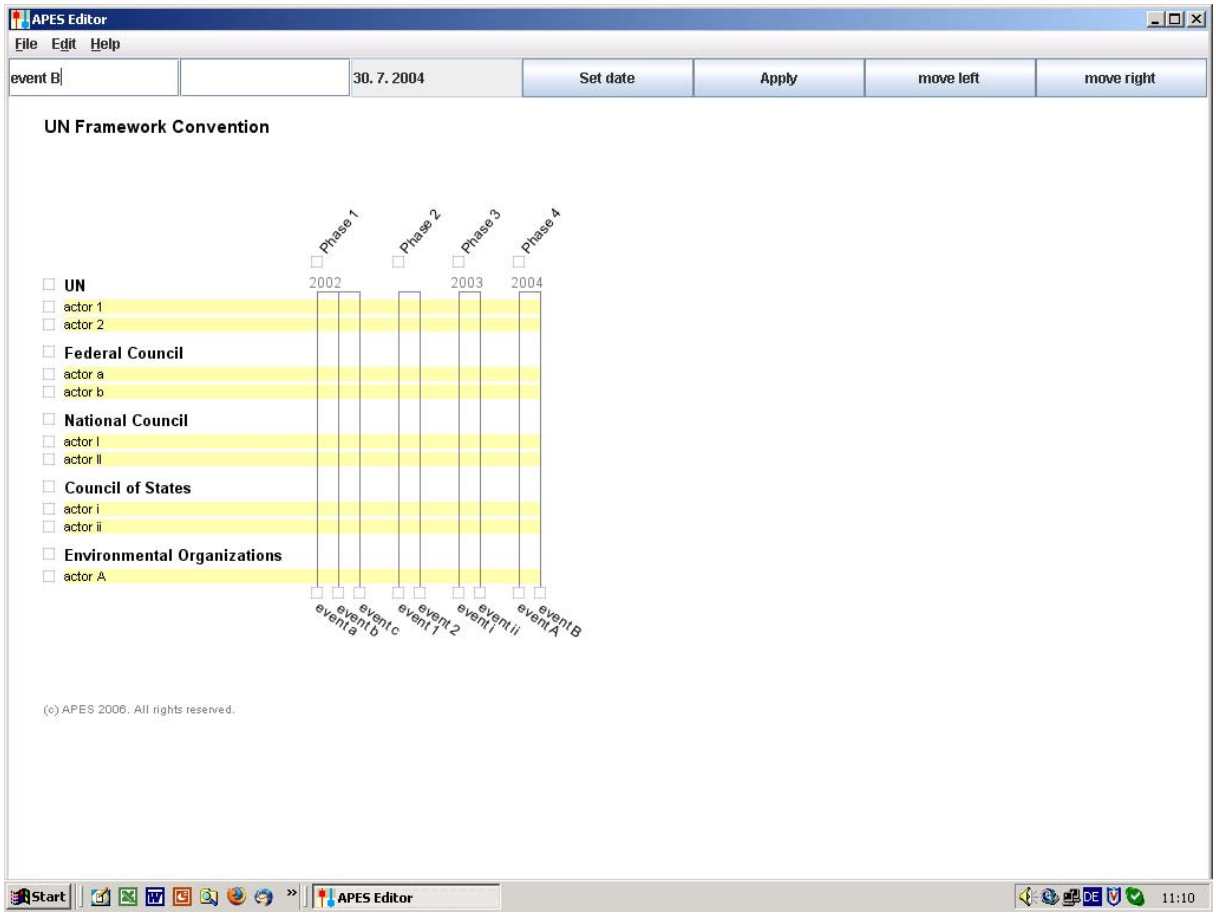
B. Create events

1. Go to “Edit” -> Choose “Add a new event” -> Choose first the phase in which the corresponding event takes place -> Enter then the name of the new event into the corresponding array -> Press “Add”.
2. Set then the date for this new event by pressing “Set the date”; a calendar window opens -> Choose the correct date on which this event took place -> Enter once again the year in which this event took place in the first array (as default figure 0 is being set) -> Press “Apply”.

3. For any additional event, repeat this procedure as often as necessary. *Do not forget to always choose the correct phase in which the corresponding event took place.*

4. For editing the label or the order of any event within a phase, put the cursor on the small box placed above each event label -> Make a right-click on your mouse; a window appears -> Within this window, choose the option “Edit” and alter your data entry for this particular event or change the order of this event by pressing either “move up” or “move down” -> Confirm by pressing “Apply” (see table 2.5).

Table 2.5 Create or edit events



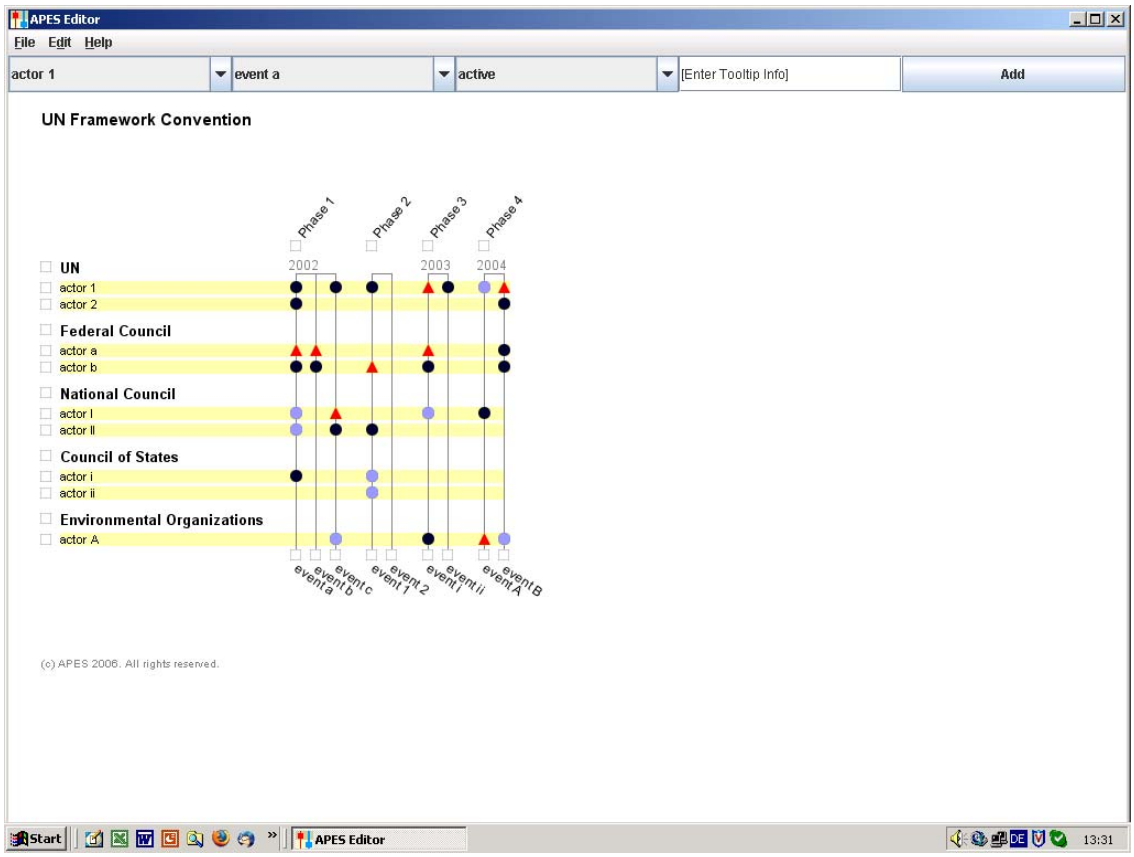
Step 5: Create relations

1. Go to “Edit” -> Choose “Add a new relation” -> Choose the actor that is to be related to an event -> Choose the corresponding event -> Set a relation attribute, if applicable

(by default all relations are set as “active”; choose “passive” for a passive participation, or “leading” for a leading function of this particular actor for this particular event) -> If applicable, enter a tool tip info into the corresponding array -> Press “Add” (see table 5.1).

2. For any additional relation, repeat this procedure as often as necessary.
3. For editing relations per event, move your cursor to the participation symbol you want to edit (dot or triangle) -> Make a right-click on your mouse; a window appears -> Within this window, choose the option “Change participation” -> By clicking this option the chosen participation symbol alters automatically between dark- or light-coloured dot (active or passive participation) and triangle (leading participation). Click this option repeatedly until your preferred participation symbol appears.
4. For deleting a relation, move your cursor to the participation symbol you want to delete (dot or triangle) -> Make a right-click on your mouse; a window appears -> Within this window, choose the option “Delete”.

Table 2.5 Create relations



Step 6: Edit actor relation types

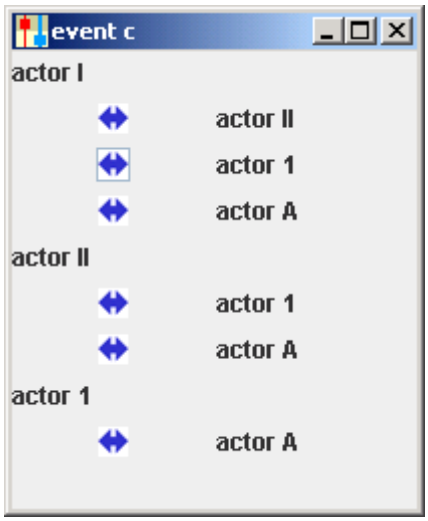
If you are using APES in connection with SNA and therefore plan to visualize (see step 10) or to export (see step 11) the data matrix generated by APES, you may want to edit the type of actor relations per event. By default, APES suggests a symmetric interaction between all actors participating in the same event. Since a symmetric interaction does not always correspond with empirical findings though, APES provides additional actor relation types. The user can therefore choose between a mutual, symmetric interaction (by default), an asymmetric sender relation or an asymmetric receiver relation.

In order to edit actor relation types, follow the instructions below:

1. Move your cursor to the box above the particular event for which you want to edit the actor relation type -> Make a right-click on your mouse; a window appears -> Within this window, choose the option “Edit actor relation”; a window showing all relations between all participating actors for this particular event appears (see table 2.6).
2. Within this window, move your cursor to the arrow-symbol of the actor relation you want to edit -> Click the arrow-symbol you want to edit repeatedly, until your preferred arrow-symbol appears.

Choose the double arrow for a symmetric relation (<->),the arrow pointing to the right-hand side for an asymmetric sender relation (->), or the arrow pointing to the left-hand side for an asymmetric receiver relation (<-).

Table 2.6 Edit actor relation types



Step 7: Hide/ aggregate data

A. Hide data

1. Event names can be hidden. To do so, make a right-click on your mouse; a window appears ->Within this window, choose the option “Hide event names”.

2. Hidden event names can be reset. To do so, make a right-click on your mouse; a window appears -> Within this window, choose the option “Show event names”.
3. All items within the scheme can be hidden (actor groups, actors, phases, events). To do so, choose the items to be hidden by ticking the boxes above, below or left of the corresponding item -> Make a right-click on your mouse; a window appears -> Within this window, choose the option “Hide selected items”.
4. Hidden items can be reset. To do so, make a right-click on your mouse; a window appears -> Within this window, choose the option “Show hidden items”.

B. Aggregate data

All data within the scheme can be aggregated. APES suggests three aggregation types:

a) Actor group with event (aggregation type I)

b) Phase with actor (aggregation type II)

c) Actor group with phase (aggregation type III; combination of I and II)

All three aggregation types are performed along two distinct dimensions:

- Quantitative participation (sum of all relations; visualized by the size of the nodes in the scheme)
- Qualitative participation (sum of active/ leading relations; visualized by the brightness of the nodes in the scheme)

For each aggregation type all actually existing relations are counted. Whereas the highest sum per actor group or per phase is set as key reference of 100%, all other actor groups or phases are being assessed in relation to this key reference.

For the *quantitative participation* all assessed data is filed within a five-scale interval, visualized by five distinct node sizes. The largest node stands for the highest scale, i.e. 100% (see table 2.7).

Table 2.7 Five-scale interval for quantitative participation

Node Size	Interval
	Interval 1
	Interval 2
	Interval 3
	Interval 4
	Interval 5

As for the *qualitative participation* all assessed data is filed within a three-scale interval, visualized by three distinctive degrees of brightness. The darkest node stands for the highest scale, i.e. 100% (see table 2.8).

Table 2.8 Three-scale interval for qualitative participation

Brightness of Node	Interval
	Interval 1
	Interval 2
	Interval 3

Whereas aggregation types I and II are performed independently from one another, aggregation type III is a combination of I and II. Therefore, all aggregated nodes within aggregation type III are to be understood as an intersection of aggregation types I and II. Each

key reference in aggregation type III is therefore assessed in relation to aggregation types I and II.

Please note, that all aggregations are always performed in relation to all actually existing relations within the scheme, including the ones that are not being aggregated. Therefore, if you edit any relation within the scheme, be aware, that aggregated nodes may most probably alter as well.

In order to perform all aggregation types, follow the instructions below:

a) Actor group with event (aggregation type I)

1. Tick the box left of the actor groups you want to be aggregated (see table 2.9).
2. Make a right-click on your mouse; a window appears -> Within this window, choose the option “Aggregate selected items” (see table 2.10).
3. If you wish to reset the aggregation feature, make a right-click on your mouse; a window appears -> Within this window, choose the option “Reset Graph” -> Deactivate the ticked boxes left of the actor groups by ticking them again.

Table 2.9 Selected actor groups to be aggregated

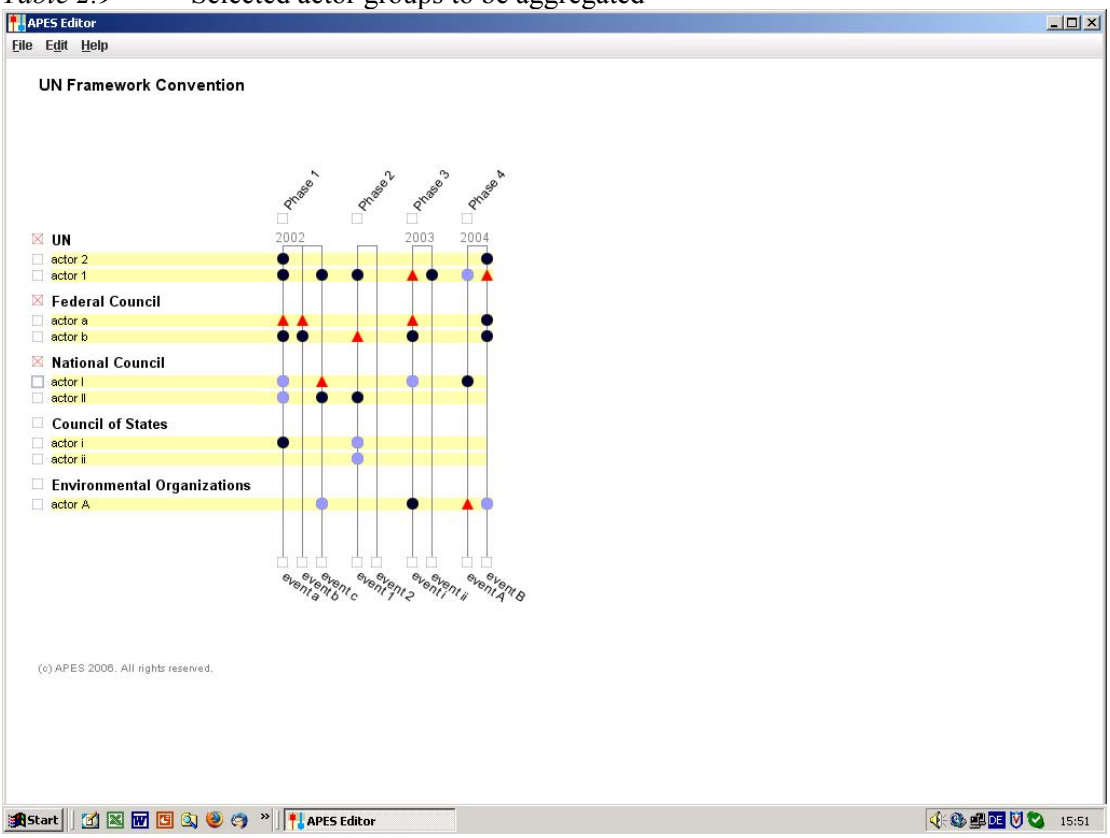
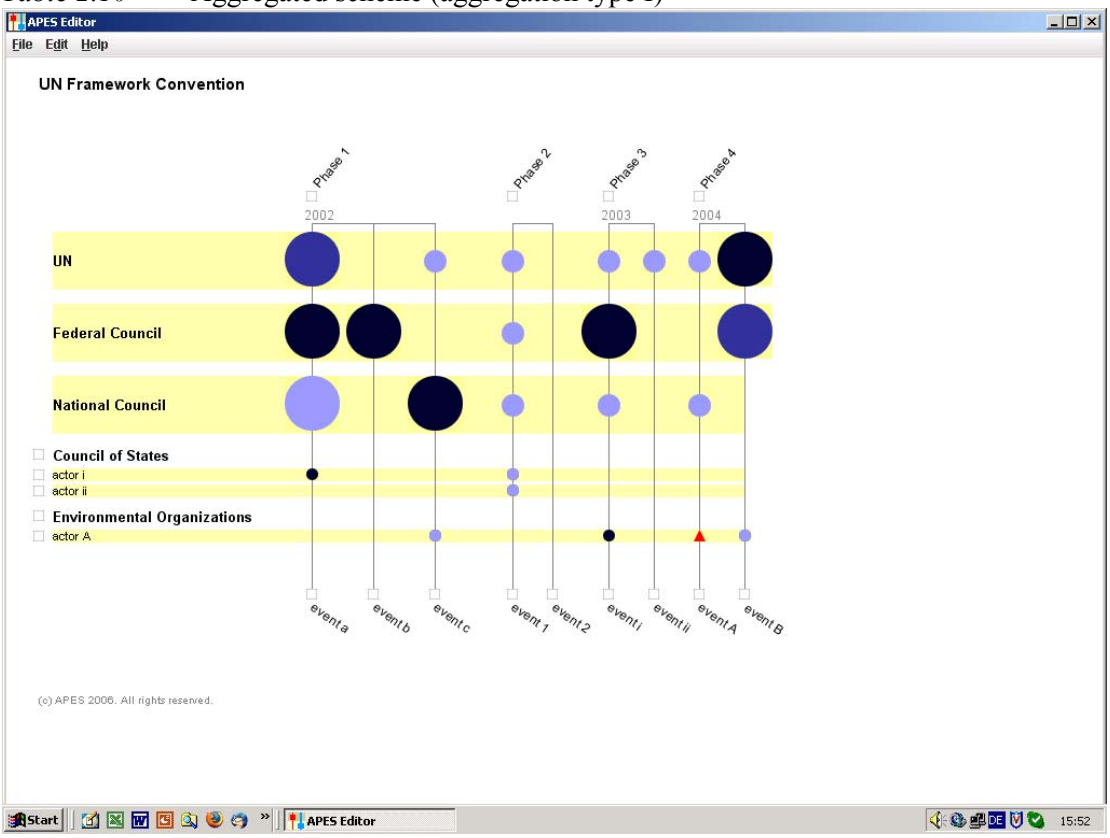


Table 2.10 Aggregated scheme (aggregation type I)



b) Phase with actor (aggregation type II)

1. Tick the box below the phases you want to be aggregated (see table 2.11)
2. Make a right-click on your mouse; a window appears -> Within this window, choose the option “Aggregate selected items” (see table 2.12).
3. If you wish to reset the aggregation feature, make a right-click on your mouse; a window appears -> Within this window, choose the option “Reset Graph” -> Deactivate the ticked boxes below the phases by ticking them again.

Table 2.11 Selected phases to be aggregated

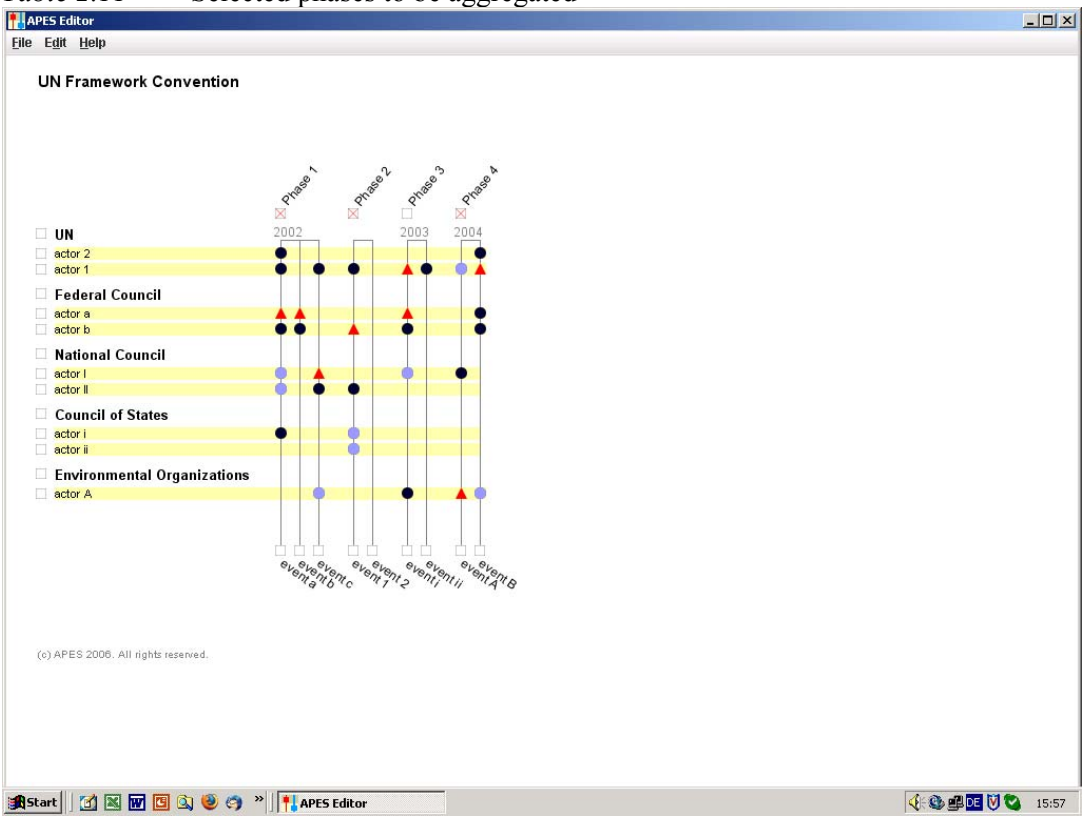
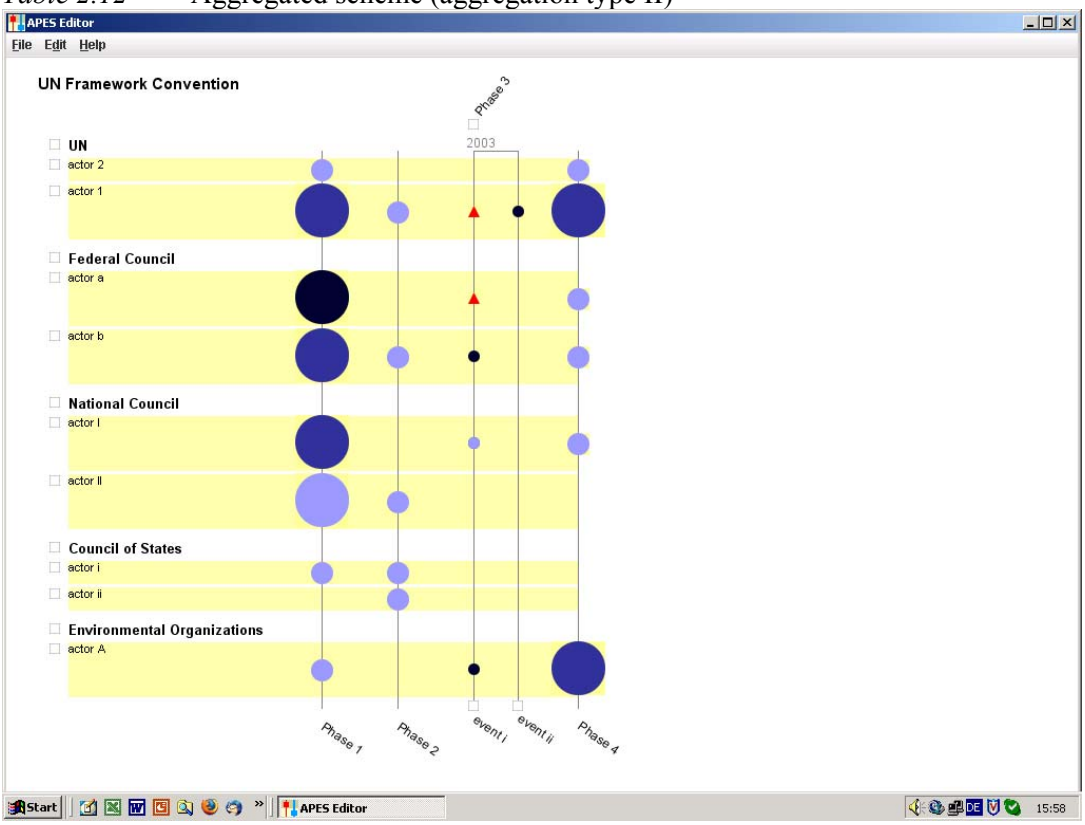


Table 2.12 Aggregated scheme (aggregation type II)



c) Actor group with phase (aggregation type III)

1. Tick the box left of the actor groups and below the phases you want to be aggregated (see table 2.13).
2. Make a right-click on your mouse; a window appears -> Within this window, choose the option “Aggregate selected items” (see table 2.14).
3. If you wish to reset the aggregation feature, make a right-click on your mouse; a window appears -> Within this window, choose the option “Reset Graph” -> Deactivate the ticked boxes left of the actor groups, respectively below the phases by ticking them again.

Table 2.13 Selected actor groups and phases to be aggregated

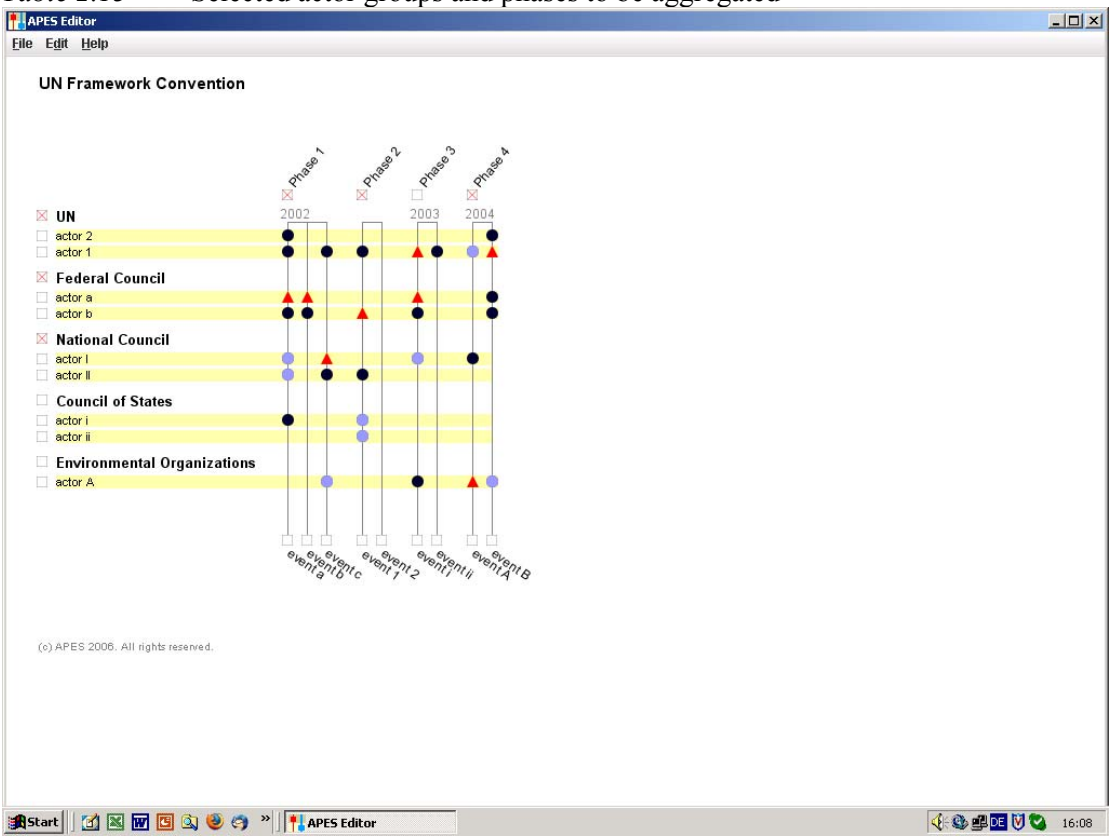
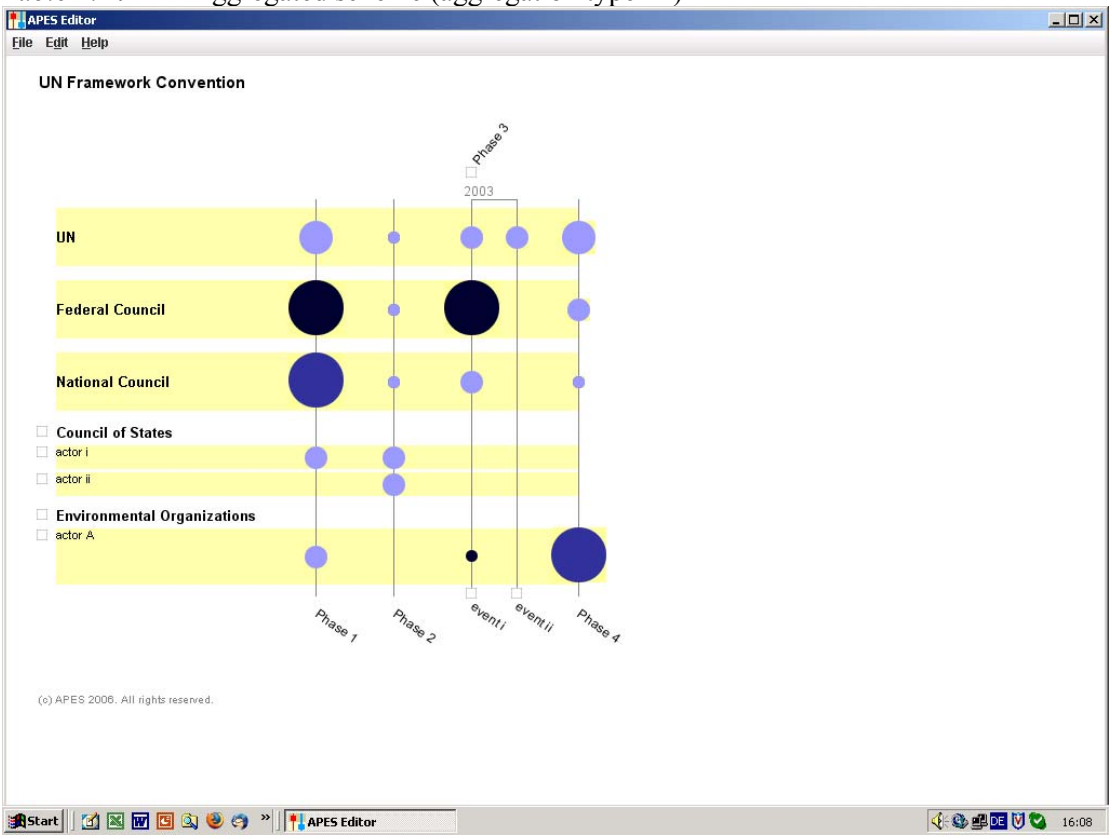


Table 2.14 Aggregated scheme (aggregation type III)



Step 8: APES Descriptives

APES provides three types of descriptives:

1) Actor descriptives:	Conceptualized as the sum of all participations during the entire process per actor/ actor group and per attribute (passive, active and leading; absolute and relative numbers)
2) Event/Process descriptives:	Conceptualized as the duration of each phase (calculated as the sum of days between the first and the last day per phase; absolute (number of days) and relative numbers)
3) Combined descriptives:	Conceptualized as the sum of all participations per actor/ actor group and per attribute for each phase of the process (absolute and relative numbers).

Step 9: Save a scheme

A. Save a Scheme as xml-file

Go to “File” -> Choose the option “Save” -> Enter correct path (keep the suggested suffix (.apes), if you whish to reopen the file with APES).

B. Save a Scheme as jpg-file

Go to “File” -> Choose the option “Export as image (jpg)” -> Enter correct path.

Step 10: Visualize Network

APES provides a visualization feature that transforms a scheme into a sociogram, visualized as a target diagram. Within a target diagram all nodes are arranged according to a specific attribute, usually it is a centrality measure. Each node is then placed on a distinct radius, whereas the node with the highest centrality value is placed close to the centre, and the ones with low centrality measures are arranged on the periphery of the target diagram. In the current version of APES, the target diagram is plotted by the use of Bonacich's eigenvector centrality (Bonacich 1972). With eigenvector centrality, a node is considered as central, if it is directly connected to other nodes who are central as well.

For the calculation of eigenvector centrality, APES extracts an actor-event matrix from the scheme and transforms it into a one-mode actor-actor matrix. The program then computes eigenvector centrality for each actor and runs an algorithm through the calculated centralities, which assigns each actor a radius according to its centrality measure. The network is then plotted as the target diagram.

Step 11: Export and import files from/ to other software applications

For further network calculations, APES files can be exported to other software applications such as Ucinet (Borgatti et al. 2002). APES generates both an actor-event matrix and an actor-actor matrix, derived from the scheme itself. The matrices are saved as text-files (csv), which can be exported into other software applications.

3 Comparative Case Study Analysis

As a brief outline of how APES can be applied in terms of comparative case study analysis, we have compared four of our cases on Swiss decision-making processes with regard to the involvement of societal actors. The concept of *participation* is very prominent in the analysis of quality of democracy (see Diamond/Morlino 2005). One of the basic assumptions of democracy is namely the participation of citizens and societal associations in the decisional process of public policy. No regime can refer to democratic standards unless it grants its individuals the right of political participation, including suffrage. We suppose the more societal actors are involved in a decision-making process, the more open the political system and the broader the possibilities of participation for its citizens. A high participation of societal actors within the policy process will therefore stand as an indicator for high participation standards. Of course, a conclusion from a high participation standard to the entire concept of quality of democracy would be empirically unrealistic and wrong. However, APES can be very useful developing a benchmark for the evaluation of policy processes, as well as delivering a standardization of qualitative case study data.

The participation of societal actors in a policy process can be assessed by the use of the visualized APES for each case. In addition to this, the network visualization derived from APES data provides information about the position of societal actors within the corresponding network and therefore works as an indicator for the detection of an (institutionalized) involvement of these actors in the decision-making process.

3.1 Case Study Data

The case studies we are using, stem from our own case study work over the last few years and from master theses, applying APES. The following case studies are taken into investigation (cases no. 1-2 are decision-making processes on bilateral international treaties, whereas cases no. 3-4 are policy processes on a domestic issue)[2]:

1. Investment Protection Agreement between Switzerland and Nicaragua, 2000 (Soland 2005)
2. Unemployment Insurance Agreement between Switzerland and the Federal Republic of Germany (FRG), 1982 (Klöti et al. 2005)
3. Revision of the Swiss Unemployment Insurance Law, 1995 (Vögeli 2003)
4. Total Revision of the Swiss Asylum Law, 1999 (Valero 2005)

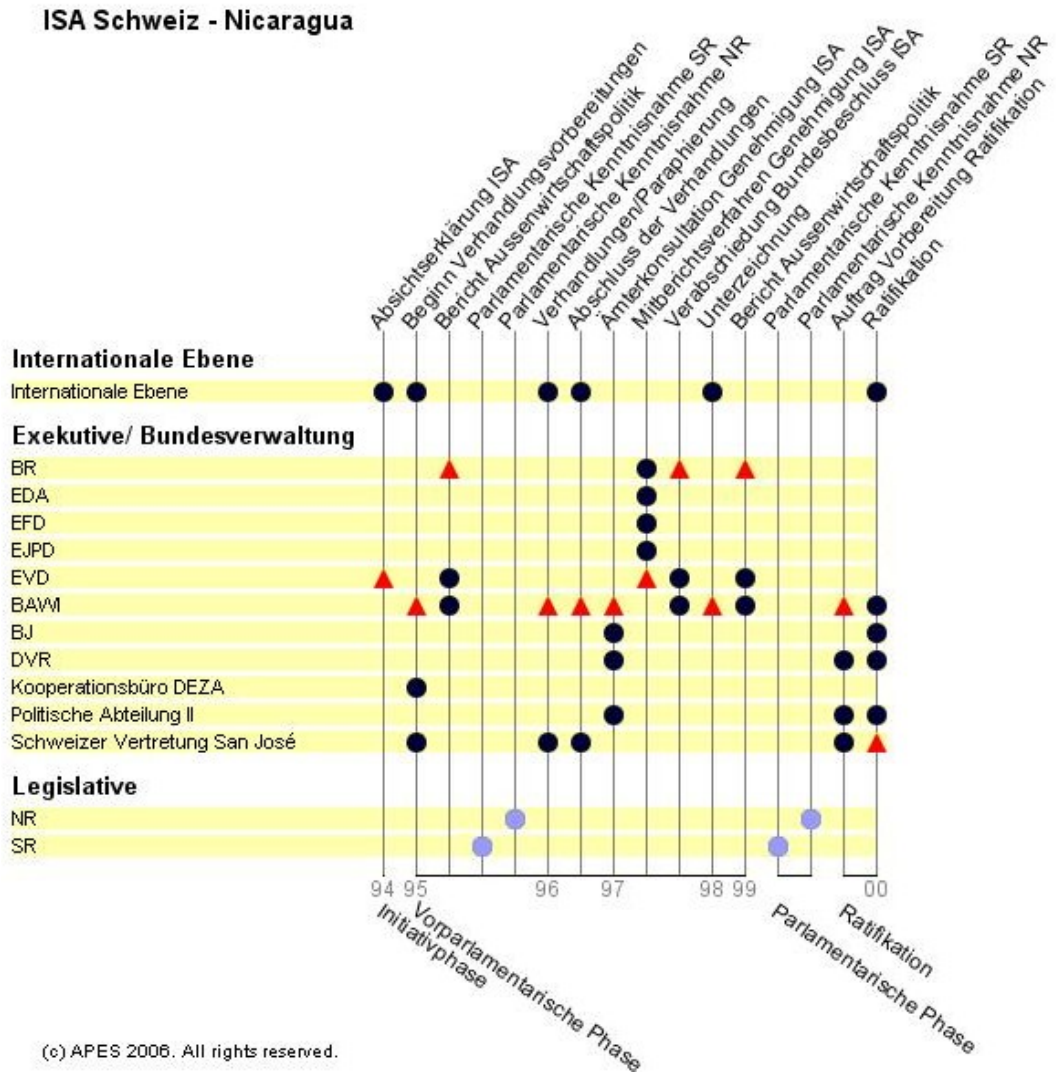
The active event-participation per actor can be deduced from the APES table itself, whereas the network data is derived from the APES data and calculated according the transformations mentioned above (see chapter 2.1) . Since in the current version of APES the feature of the target diagram is not completely implemented yet, we will use the software package visone (visone project team 2003) for plotting target diagrams for all four cases. The target diagrams that visone suggests, show the same features as the ones provided by APES: „We (…) place vertices such that their distance from the center of the diagram is proportional to their centrality score. (...) A target diagram displays social choice within a group by placing actors inside of rings corresponding to centrality quartiles (…)" (Brandes et al. 2003:243). For our case study analysis, we will therefore import the actor-actor matrices generated by APES into the visone software application and compute the target diagrams by the means of degree centralities for all involved actors.

[2] In both foreign and domestic case studies, we are only interested in the domestic dimensions of the policy process, i.e., we do only consider domestic actors and their position within the policy network. Since our data has been used for publications in German, the displayed APES and target diagrams are as well labelled in German.

a) Foreign Policy Processes

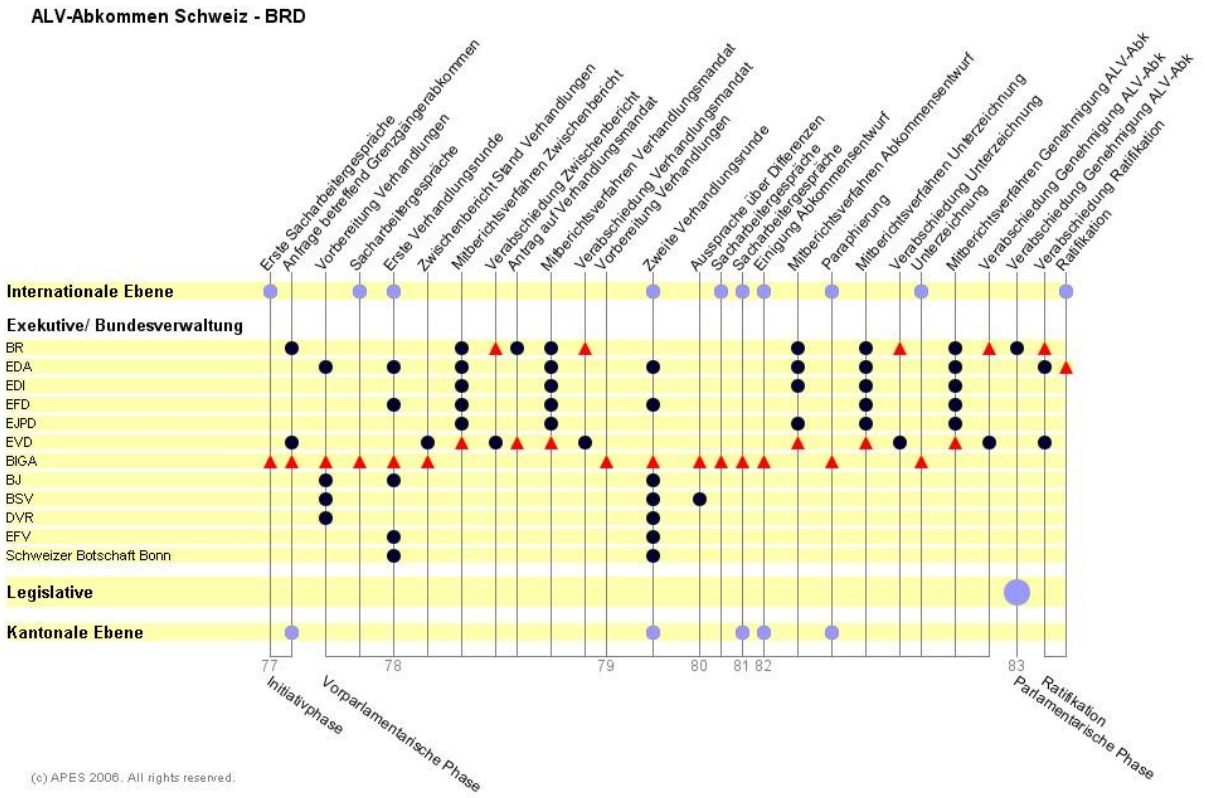
First lets have a look at the APES (see tables 3.1 and 3.2) and target diagrams for the two foreign policy processes (no. 1-2). Both the investment protection agreement between Switzerland and Nicaragua, as well as the unemployment agreement between Switzerland and the FRG show no involvment of societal actors at all. It is the actors of the executive authority and the federal administration ("Exekutive/Bundesverwaltung"), as well as the cantons ("Kantonale Ebene; see especially case study no.2) that dominate the decision-making process at all stages.

Table 3.1: APES Investment protection agreement Switzerland – Nicaragua



Source: Vögeli 2007: forthcoming

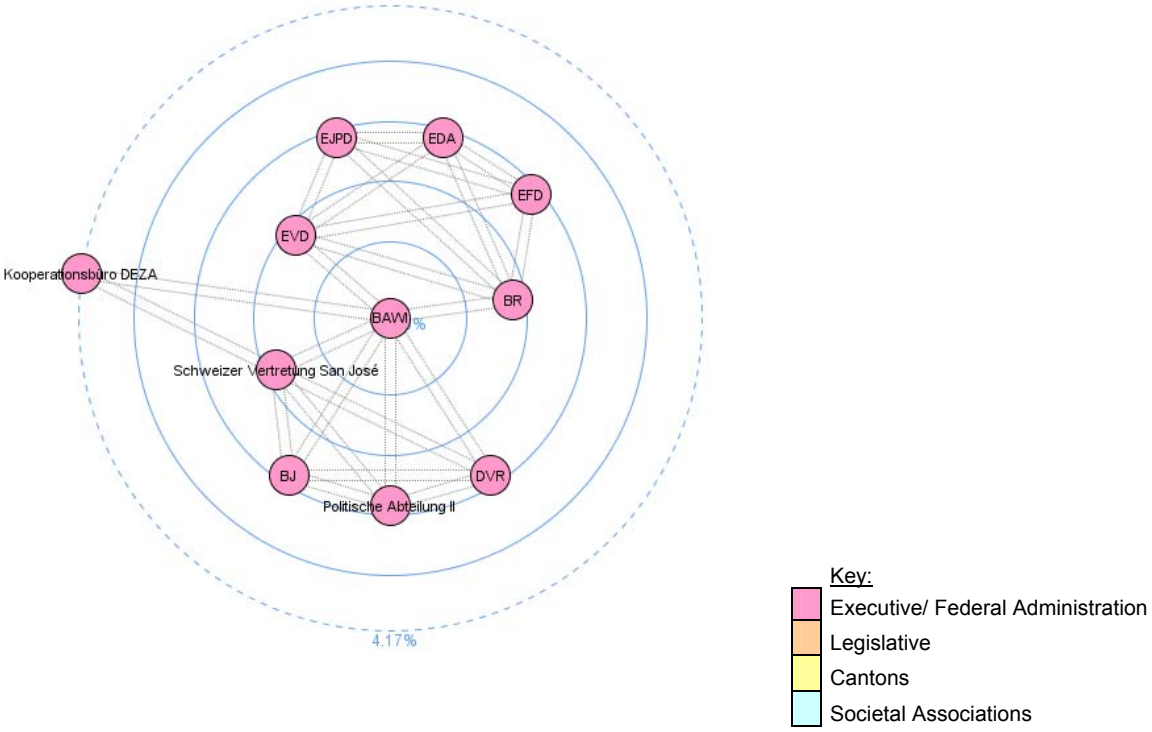
Table 3.2: APES Unemployment Insurance Agreement between Switzerland and the Federal Republic of Germany (FRG)



Source: Vögeli 2007: forthcoming

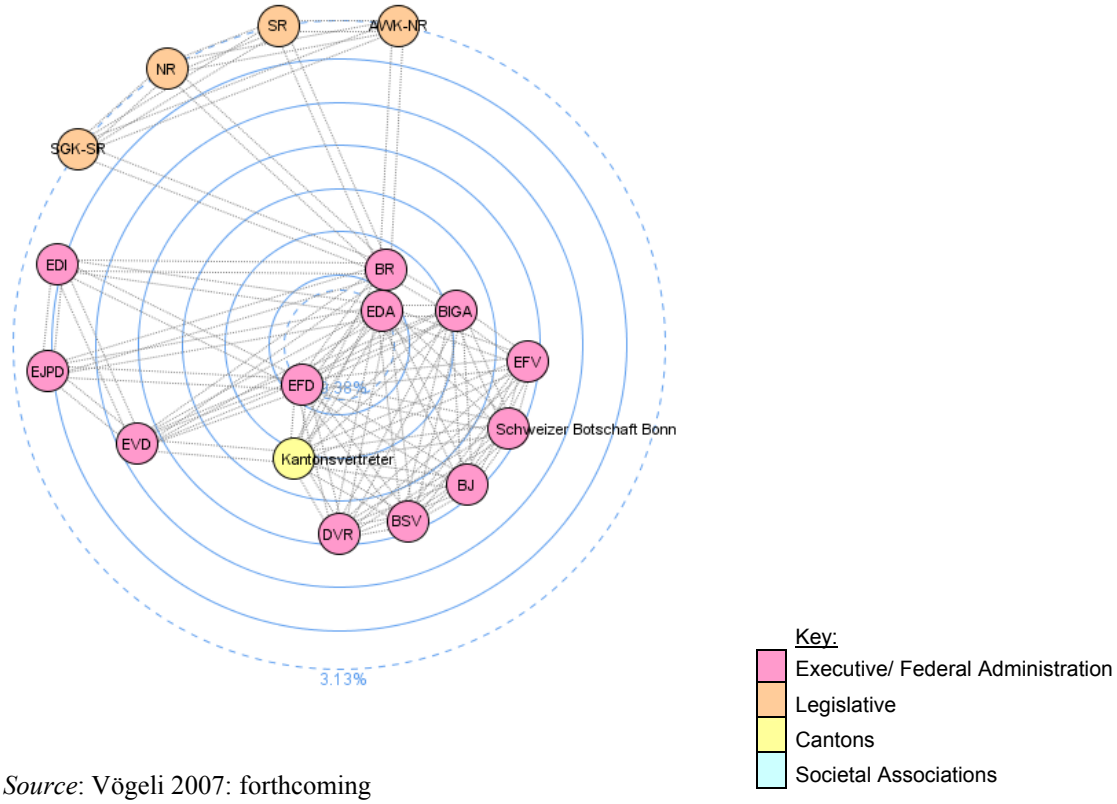
The same results are being shown for the calculated target diagrams. The plotted networks display the importance of state actors for both cases, since societal actors are not involved at all during the whole policy process. It is the federal administration that dominates both decisional processes, and therefore show the highest degree centrality, e.g. is placed close to the center of the target diagram (see tables 3.3 and 3.4).

Table 3.3: Target diagram Investment protection agreement Switzerland – Nicaragua



Source: Vögeli 2007: forthcoming

Table 3.4: APES Unemployment Insurance Agreement between Switzerland and the Federal Republic of Germany (FRG)

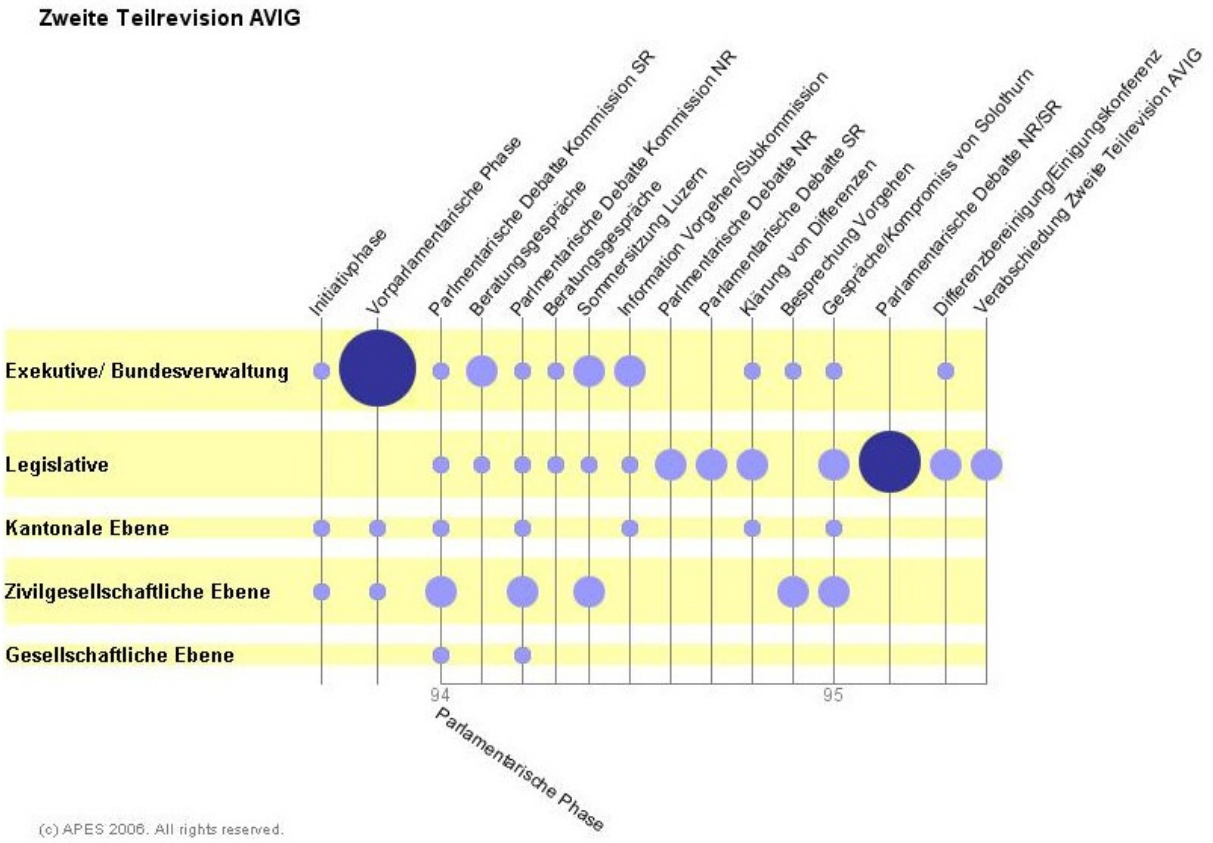


Source: Vögeli 2007: forthcoming

b) *Domestic Policy Processes*

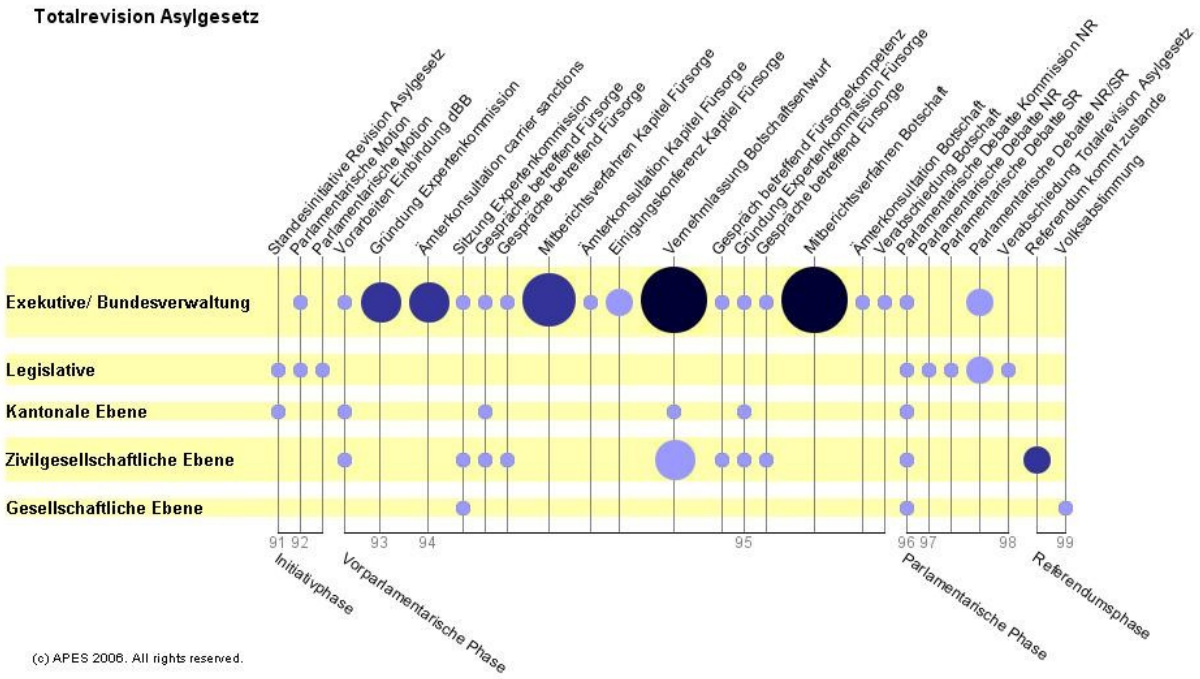
The domestic cases show a completely different picture regarding the participation of societal actors. Both the revision of the Swiss unemployment insurance law and the total revision of the Swiss asylum law reveal a great involvement of societal actors ("Zivilgesellschaftliche Ebene" and "Gesellschaftliche Ebene") during the policy process (see tables 3.5 and 3.6). Of course also state actors – most of all the federal administration – do clearly play an important role in both cases. But the dominant position of the societal associations during the policy process is nonetheless obvious.

Table 3.5: APES Revision of the Swiss Unemployment Insurance Law



Source: Vögeli 2007: forthcoming

Table 3.6: APES Total Revision of the Swiss Asylum Law

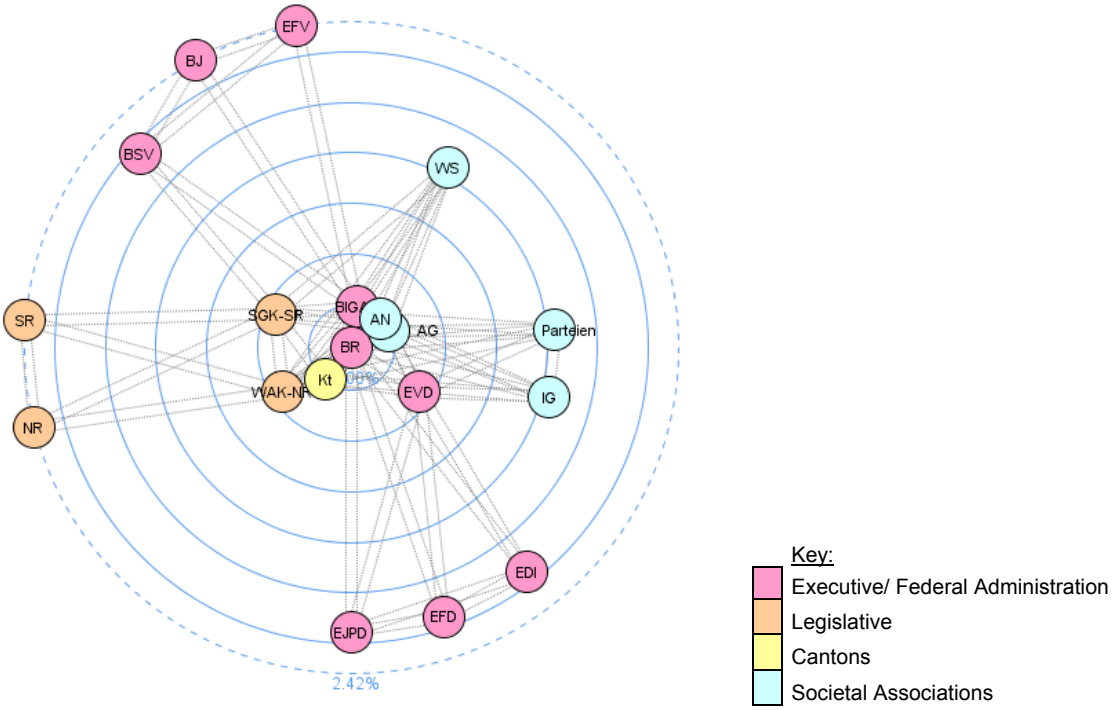


Source: Vögeli 2007: forthcoming

Both of the above displayed APES were aggregated in order to make the involvement of societal actors even more visible (see actor groups "Zivilgesellschaftliche Ebene" and "Gesellschaftliche Ebene" in table 3.5 and 3.6). Unlike the foreign policy processes discussed first, both domestic cases seem more susceptible and accessible for societal actors.

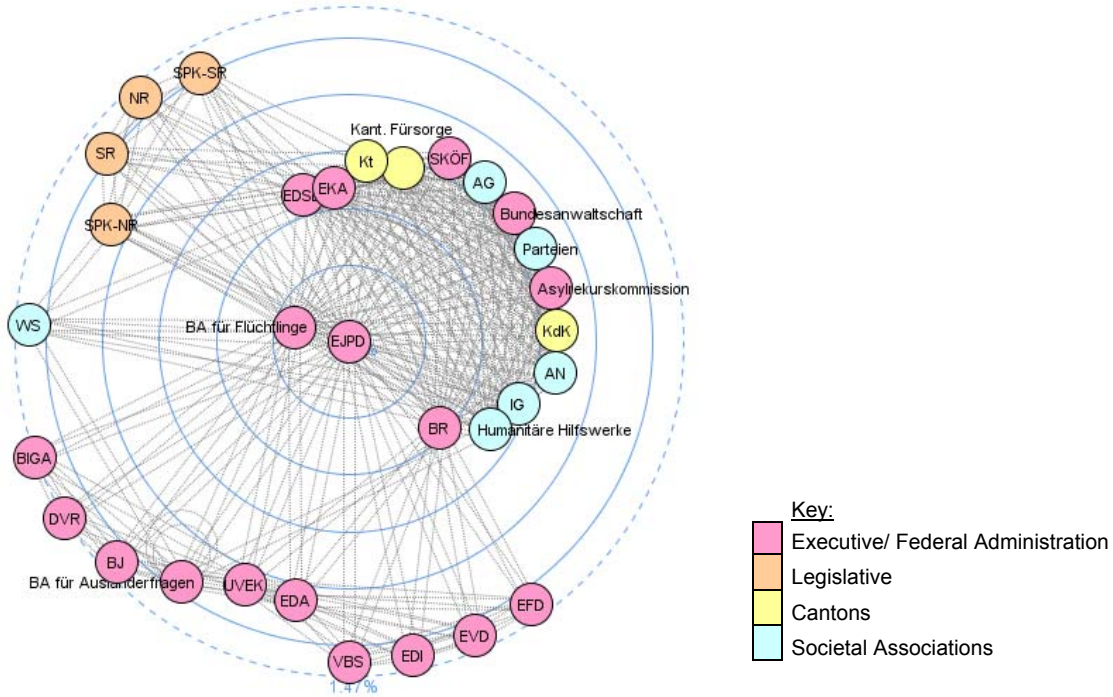
The target diagram gives us information about the position of societal actors within the network. According to the results of the APES, the societal actors should as well take a prominent, e.g. central position in the sociogram.

Table 3.7: Target diagram Revision of the Swiss Unemployment Insurance Law



Source: Vögeli 2007: forthcoming

Table 3.8: Target diagram Total Revision of the Swiss Asylum Law



Source: Vögeli 2007: forthcoming

3.2 Comparison and Conclusions

The results for both Swiss foreign and domestic policy processes let us draw the following conclusions in reference to the concept of participation:

- There is an obvious *difference between foreign and domestic policy-making cases* regarding the inclusion of societal actors into the decisional process. Whereas in foreign policy cases the active participation of societal actors is low (or rather inexistent in our two cases), for domestic policy processes the participation of societal associations can be valued as comparatively high.
- Mostly out of procedural reasons the *federal administration plays an important role* in foreign policy processes, whereas in domestic cases the federal administration looses some of its influence, since a greater number of actors moves into the centre of the policy network, i.e. participates at the decisional process. Additionally, if a (foreign) policy case is considered as being below the 'threshold of perception', which means is not perceived by the public because of its often non-controversial character (see case no. 1), the federal administration is comparatively more active, than in other cases, which are publicly noticed.
- *Parliamentary actors*, such as the National Council, the Council of States, and parliamentary committees, *tend to show a quite low involvement*, especially in foreign policy cases. One can state a higher involvement of parliamentary actors however in domestic policy processes.
- For the cantons similar conclusions can be drawn as for parliamentary actors: One can asses a *comparatively higher cantonal involvement in domestic policy cases, than in foreign policy processes*, except in foreign policies on social issues (see unemployment insurance agreement with FRG; case no. 2).

With this very brief comparison of four decision-making processes, understood as operationalization of the concept of participation as a prominent concept within the quality of democracy approach, we tried to show one possible field of application for APES. We agree that a broader operationalization of the concept would be helpful to gain more founded empirical evidence. We do believe however, that with APES qualitative case studies can be visualized and put on a standardized level. Like this, we see possible applications for APES in all academic fields, where comparative, process-oriented case study designs play an important role.

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