HOW TO ORGANIZE FOR LOCAL RESOURCE GENERATION

Tomas Backström, School of Innovation, Design and Engineering, Mälardalen University, Sweden, tomas.backstrom@mdh.se

Abstract Generation of recourses is a central issue for sustainability of companies. The paper deals with two research questions: “Is decentralized generation of recourses a possible way to reach sustainability in modern work life?” and “What prerequisites have to be formed by organizations and managers to reach decentralized generation of recourses?”

Theoretical base for the discussion is complex adaptive systems theory. Three requirements for sustainable decentralized resource production are deduced; worker’s autonomy, worker’s integration in the organization and demands on increased fitness.

Empirical bas for answering the questions is studies of four different Pharmacy-districts, each with a different organizational solution. Three sources of data are used: Interviews with the four Pharmacy-district managers. Questionnaire to all employees. The balance scorecard of the company.

Two of the districts may have reached an unbalance at system level between autonomy and integration. The other two districts have similar scores of medium for both autonomy and feeling of integration. One of the balanced districts has also a manager focusing bottom-up change processes. This district has both the strongest resource generation and a leading position in increasing efficiency and customer satisfaction, and thus sustainability.

Decentralized recourse generation is one way to reach sustainability, and co-existence of both autonomy and integration of employees combined with a leadership of transformative character is favorable for this.

Keywords: Research paper, sustainability, complex systems, autonomy, integration, resource generation.

1. INTRODUCTION

“The core concept of sustainable work systems is that the resources deployed are regenerated by the system” (Docherty et al., 2002), p 11). The aim of this paper is to describe one way to organize for generation and regeneration of resources. One may differentiate between finite, regenerative (e.g. technology, material and peoples physical and mental health) and generative resources. (Moldaschl, 2002). This paper will focus on the management of generative resources, i.e. resources which are created and amplified when they are used, e.g. human capacities like skill, creativity, knowledge and trust.

Centralized and decentralized resource management are two fundamentally different ways to organize for generation and regeneration of resources. A historical review over human societies (Diamond, 2006) show examples of both of them. Japan 1650-1868 is an example of successful centralized resource generation. Before 1650 Japan had an era with peace and prosperity resulting in a population boom. Growing population and richness led to an extensive need of wood to make houses, elite monuments and ships. This resulted in deforestation and a similar situation that led to a collapse of societies like Eastern Islanders, Maya, Rwanda and Haiti. But in Japan the Shoguns formed a strategy 1650 including: official sparing ideology, stable population, more seafood less farming, new fishing techniques, ownership of sea adjacent to land, fertilizers, inventory and control of cutting of trees. A condition for long term strategies with strong short term disadvantages, is a ruling class who believe that their descendants are dependent on the long term success of the society (ibid p 305). The Shoguns of Japan were examples of such long term committed leaders.

Translating the example of Japan to work life; for sustainable centralized resource production in companies to function, managers have to be long term committed to the enterprise. This is not the case in most companies. Modern corporate governance is characterized with impersonal ownership and frequent change of CEO. The turnover rate of CEO:s was over 13 % in a study of 683 non-financial UK listed companies from 1993 to 1998 (Hillier et al., 2005). Of the 2,500 largest companies worldwide, close to 15% appointed a new chief executive in 2004 (McKeon, 2005). If sustainability based on centralization seems to be questionable in a modern work life, how about a decentralized solution?
An example of successful decentralized resource generation is New Guinea Highlands with 7,000 years of sustainable food production in an isolated area, a unique historical record (Diamond, 2006). They have developed an advanced agri-and silvi-culture. In New Guinea Highlands decisions are traditionally reached by everyone sitting down together talking. There are "big-men" – influential personalities, but there are no chiefs. Sustainable decentralized resource production is dependent on interaction giving members of society a possibility to see and take interested in the entire society (ibid p 427).

The first conclusions of this article are that sustainability based on centralization may not be applicable in most modern work life and that there exist historical examples of sustainable decentralized generation and regeneration of resources. The research questions of the paper are, based on these conclusions:

What prerequisites have to be formed by organizations and managers to reach decentralized generation of recourses?

Is decentralized generation of recourses a possible way to reach sustainability in modern work life?

Resource generation is measured as an ability of the company to adapt and innovate. This article deals with sustainability for organizations; pharmacy districts, and focus two of the stakeholders: the owner, and the customers. Sustainability is measured as a growth in both efficiency and customer satisfaction.

2. COMPLEX ADAPTIVE SYSTEMS THEORY

Sustainable decentralized resource production is dependent on interaction. Complex adaptive systems theory is dealing with emergence of structures and resources in interaction between autonomous and integrated actors (Marion, 1999). Complex systems is also meant to be the natural way of living objects and creatures to reach sustainability (Cohen and Steward, 1994).

2.1. Complex systems and autopoiesis

Complexity lies on the edge between order and chaos (Kauffman, 1995). Order will reign in a system where the actors are well integrated and have small chances to act autonomously. In a classical industrial productions system for example, standardization and centralized control is used to integrate specialized work processes ensuring that they act together producing the goal. Such high degree of integration and low degree of autonomy give an ordered and stable production, but adaptation and creativity will be a problem. In a system where actors are autonomous, but not integrated, the opposite will occur. Each competent actor will be able to autonomously ensure good adaptation to the respectively local situation. But since they are not integrated they will soon act individually towards individual goals, and the company will dissolve into a bunch of individual entrepreneurs.

The dynamics of complex systems gives possibilities of sustainability, because of two reasons. Firstly, adaptation on system level, through autonomy of parts the adaptation and innovation towards increased fitness is possible and, through integration, co-operation towards the same goal and thus increased fitness for the whole system is possible. Secondly, complex systems have autopoiesis, meaning that they produce themselves and resources needed (Maturana and Varela, 1987). The system is emerging from inside, not designed by an outsider (Capra, 2002). It is the co-workers who generate it and its resources through a self-generative and auto-catalytic processes where the resources needed, and thus used, will be strengthen. This self-production, or decentralized production of resources, is the focus of this paper.

2.2. Autonomy and integration in organizations

Theoretically an organization with integrated autonomy for co-workers will be a complex system (Backström, 2004). Different kinds of control used in organizations to integrate the actions of the workers into the operation of the company are: direct control, bureaucratic control, technological control and normative control. A mixture of these is normally used in companies. A high degree of normative control may be a way to have both autonomy and integration at the same time. Normative control consist of socially constructed structures like a common vision (Källström, 1995), a company culture (Alvesson and Willmott, 2002), an institutionalized praxis (Berger and Luckmann, 1966), a relatonic (Backström and Döös, 2008) and a membership (Luhmann, 1990).

Interaction is important to make social construction possible. Quantity and quality of interaction are central themes in articles about leadership from a complexity perspective, see e.g. (Backström et al., 2006, Surie and Hazy, 2006, Uhl-Bien et al., 2004). Studies of team work has shown that normative control may develop into concertive control, where colleagues restrict each others autonomy more strict than any leader possibly could (Barker, 1999). A former study at one of the organizations studied in this paper,
below named the Integrative Organization, indicate signs of concertive control (Göransson, 2003).

2.3. Urge for fitness

There must be a need for adaptation for complex dynamics to develop. In complex systems there is no leader recognizing the need to adapt, but the aggregation of individual actors. Some feedback mechanisms on system level give individual actors reasons to adapt their actions to increase the fitness of the system. To reach sustainability through decentralization, the urge to change has to be felt by the co-workers. Feedback processes, showing the consequences of how you choose to work in specific situations, are important motives for development. The leadership is also important for this. Transformational leadership, developed in the end of 20th century, focuses development and uses interaction motives like a common vision (Bass, 1998, Burns, 1978).

Using the model the research questions of the paper can be translated into two hypotheses to be tested:

1. Autopoiesis, or decentralized generation of resources, occur in complex organizations, where co-workers to a high degree are autonomous, integrated in the organization and recognize an urge to change the organization toward increased fitness.

2. Organizations with decentralized generation of resources exist and are sustainable.

3 METHOD AND DATA

Multiple sources of evidence (Yin, 1989) have been used to give a more solid base for conclusions. This includes:

1. Interviews with district managers.
2. A questionnaire given to all employees.

To enhance the validity, a first version of synthesis and interpretations of data have been reproduced to the districts and been discussed and improved.

3.1. Interview with the District Manager

The interviews conducted with the four district managers were semi-structured, and lasted approximately 60 minutes each. The questions concerned the way the organization was supposed to function and revolved around five main themes, and each theme contained several subtopics.

The themes were:

- Organizational structure.
- Information flow.
- Management control.
- Leadership.
- Learning.

The interviews were taped and transcribed. Results of the interviews are used to describe each pharmacy-district under heading 4.3. Descriptions of the four cases and in the interpretation of the results in the discussion.

3.2. Questionnaire study

The questionnaire is designed to measure conditions of collective learning and learning according to a model of collective learning (Backström, 2004). The number of people at the districts at the moment of the study was 254. All of them were asked to answer the questionnaire and the answering number was 226 (89%). The frequency of missing answers varies between 2-14
% for different questions. All measured differences between districts are real and significant, since almost all people have answered the questionnaire.

Questions used in this paper and variables formed

Questions from the questionnaire used in this paper are presented below, translated from Swedish to English. Answers are given on Likert scales with 1 as “I do not agree” and 7 as “I agree fully”, except questions concerning Integration where alternatives are No=1 or Yes=2. Scales based on mean values for several questions have been used to measure some phenomenon. Cronbach’s alpha is above 0.7 for all scales except for “Ability to adapt” with alpha=0.57.

Autonomy. Scale of three statements:
- I decide myself what to do in work. (Hagström and Sconfienza, 1995)
- I have influence on the contents of work. (Hagström and Sconfienza, 1995)
- I may take my own initiatives in work. (Hagström and Sconfienza, 1995).

Hinders to autonomy:
- I sometimes feel hindered to choose the way to work I consider best.

Integration. Scale of three questions:
- Do you use to reflect upon how your work influences the achievement of goals for the district?
- Do you use to reflect upon how your work influences colleagues in the district?
- Do you feel solidarity with colleagues in the district?

Style of leadership of the district manager. One question for each manager’s task; reproduction, transformation respectively integration (Backström et al., 2006):
- My district manager devotes a lot of time to manager tasks like e.g. planning, giving instructions and standpoints, administration etc.
- My district manager devotes a lot of time to the thinking of the personnel (e.g. formulate and disseminate visions, values, strategies etc.).
- My district manager devote a lot of time to the social climate (e.g. listening, trouble-shooting, emphasizing team-spirit and cooperation, formulating conflicts, arranging talks etc).

Organization’s ability to adapt. Scale of two statements:
- At my pharmacy we are quick to learn from other workplaces, even from outside the Apoteket AB.
- We rapidly find new ways to work at my pharmacy when conditions change (e.g. introduction of new technology, changes in staffing, new routines).

Organization’s ability to innovate. Scale of four statements:
- We develop new goals of our own at my pharmacy (e.g. goals for additional aspects than the district).
- We develop new goals of our own at my district (e.g. goals for additional aspects than the Apoteket Hälsa).
- We are sometimes first with new ideas and ways to work at my pharmacy.
- We are sometimes first with new ideas and ways to work at our district.

3.3. Balanced scorecard

Computer printouts from Apoteket AB’s balance scorecard system were provided by the region managers.

Efficiency is measured by the operational costs divided by the weight of volume. Operational costs are calculated using total costs, excluding costs of goods. Weight of volume is the sum of different weights of order items relating to the sales of goods. The company is state owned and has monopoly in selling drugs in Sweden. It does not have control of the price setting of their products, which makes this measure more suitable than ones based on receipts in relation to costs.

Customer satisfaction is measured by Apoteket’s own Scorecard survey, named Very satisfied customer; a questionnaire conducted quarterly that contains five questions with 1 is “I do not agree” and 5 is “I agree fully”. Each question contains the possibility to answer, “I don’t know”. Questions were:
- Today I could get service fast.
- Today I got the products I needed.
- Today I was treated well.
- Today I got the advice I needed.
- Today I am satisfied with my visit to the pharmacy.
4. CASES INCLUDED IN THE STUDY

The study is performed 2004 at Apoteket AB, a state owned Swedish pharmacy chain with monopoly in selling drugs in Sweden. The revenues of 2002 were about 3.500 million Euros. Apoteket AB’s business plan from 2001 was the start of a re-organization process for the whole company:

- new divisions developed
- more time to be used for competence demanding tasks like guidance concerning drugs and of pro-active health care
- a shift in the focus towards the customers
- a shift from planning and control towards involvement and meaning.

Apoteket AB’s new organization has been studied from a perspective of learning organization by (Ekman, 2004). The study shows e.g. that senior managers have perceived the control signals and started to lead through ideas in order to create a greater responsibility, and to use market value thinking (p 206).

4.1. Apoteket Hälsa

The pharmacies studied in this paper belong to the division Apoteket Hälsa (Pharmacy Health). This division includes all 800 pharmacies in Sweden situated outside hospitals, with about 10.000 employees. The division where divided into 10 geographical regions, and each region into districts, which is the lowest level in the organizational structure. Each district includes typically 5-10 pharmacies. The District Manager is the first-line manager, with responsibility for about 70 employees. There was no supervisor at each pharmacy anymore; this lowest level of hierarchy was taken away and the number of managers was reduced from about 800 to 144.

Apoteket Hälsa has further developed the re-organization with thoughts similar to integrated autonomy. The instructions for the Districts Managers includes: “Everybody takes the risk and will act autonomously within the frames of the laws and regulations, and guiding principles and policies that are well known to each co-employee”. The task of the District Manager was described as not to supervise daily work, but to design an organization with distributed responsibility. The greatest amount possible of responsibility and authority should be situated as local as possible. A balanced scorecard was developed, with five areas of goals: Financial, Customers, Processes, Co-employees and Development.

The design of organization of each pharmacy district was a decision for respectively District Manager. The result was districts with almost the same conditions, tasks and types of customers, but with different types of organization.

4.2. Included districts

This paper includes four pharmacy-districts, each with different organizational solutions. The districts where selected by two middle managers as being in front when it comes to the re-organization among their districts. The included districts are:

1. The district with Team Organization (Team-org), with 73 employees in five pharmacies.
2. The district with an Integrative Organization (Integat), with 43 employees in five pharmacies.
3. The district with Learning Organization (Learnorg), with 56 employees in four pharmacies.
4. The Ordinary district (Ordinary), with 82 employees in eight pharmacies.

For the first three, the names are the characterization of the districts made by the middle managers, when they first presented them for us. Characteristics that later were confirmed by the researchers as fitting their way to function. The fourth district was introduced as the district with reflection groups, but since it turned out that this activity was not in full operation when the study was performed, this district has been named Ordinary.

The district with Team Organization (Team-org)

The district has teams as its main organizational structure. The district manager is using the team managers when giving information, instructions etc to the employees. The district manager describes the Teams as a solution to problems caused by one of the pharmacies being unusually large. This pharmacy was divided into three virtual pharmacies of normal size within the old premises, each with its own team leader and staff. There are seven team leaders with a group of less than 15 employees each. Five of the Teams are the same as the staff of the five pharmacies of normal size and team leader for them is the previous pharmacy supervisor. Three Teams are the teams of the virtual pharmacies in the large pharmacy. Their leaders have been selected as potential top-managers and received a formally established post as team leader. The district manager organizes only one type of
recurrent scheduled meetings; the Manager meeting each second week.

The district with an Integrated Organization (Integrat)
The manager describes the organization as flat and decentralized. She used a model developed by (Ekstedt and Jönsson, 2001) based on Senge (Senge, 1993) when she formed the organization. She emphasizes a wish of broad participation, where every employee is included and where no one has more power than others. There is no level of managers under her. This was the only pharmacy district in the study that followed the intention of the re-organization to take away the lowest level of managers. She talks about the hard work to erase the old role as managers of the previous pharmacy supervisors.

The organizational structure of the district is described as the structure of two types of meetings:

- Responsibility Meetings.
- Pharmacy Meetings.

Each employee is part of both a group with an area of responsibility and a pharmacy and has to attend to a scheduled and obligatory one and a half hour meeting each week, alternately of the two types.

At Responsibility Meetings the group has to manage their area of responsibility:

- to analyze, make decisions and follow up,
- to write the plan of activity to the company,
- to deal with the goals set by the company and with the scorecard from the company showing how things went on in the district over the last year.

At Pharmacy Meetings suggestions from Responsibility Meetings are processed and decisions made in the Responsibility Meetings are implemented.

The district with Learning Organization (Learn-org)
The operative organization is the same as before the organizational change of Apoteket AB 2002. The pharmacy supervisor is still in charge; all her former responsibilities and authorities are re-delegated to her from the district manager. The district manager and the four pharmacy supervisors attend to weekly manager meetings.

The re-organization of the Learning Organization concerned self-organized change. It consists of the manager’s communication of visions and models about learning and development, and some structures and activities. The Egg is the more solid part of the Learning Organization. It consists of a group of four employees with an area of responsibility each, they meet weekly. The task of the Egg is to regularly communicate with other employees, encourage problem solving and creativity, notice all the ideas among the employees and support employees with ideas to form projects around the idea. The development projects are called Clouds. The Egg is giving resources to the Clouds and protecting them from short sighted demands. The Egg is also producing an internal paper (The Eggs-press) informing about new Clouds and the work of the Clouds.

The Ordinary district (Ordinary)
The manager describes an organization that almost is the same as before the organizational change of Apoteket AB 2002. Pharmacy supervisors are still in charge of each respectively pharmacy. The manager in this district underlines that the start up of two new pharmacies in her district have taken a lot of effort and resources from the reorganizing agenda. It is a reasonable conclusion from the interviews that most is as before when it comes to the practice in this district. The Ordinary district may thus be seen as a “control group” in this study.

5. RESULTS

5.1. Prerequisites for sustainability through decentralized generation

Autonomy

Autonomy varies between 4.86 and 5.13 in the different districts, Hinders to autonomy varies more; between 3.12 and 4.27 (see table 1). The management style of the team managers of the Team Organization give room for more autonomy compared to the other districts. The Integrative organization district has more Hinders to autonomy than the others.

<table>
<thead>
<tr>
<th></th>
<th>Team-org</th>
<th>Integrat</th>
<th>Learn-org</th>
<th>Ordinary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomy</td>
<td>5.13</td>
<td>4.97</td>
<td>4.86</td>
<td>5.11</td>
</tr>
<tr>
<td>Hinders to autonomy</td>
<td>3.12</td>
<td>4.27</td>
<td>3.51</td>
<td>3.69</td>
</tr>
</tbody>
</table>

Table 1 Degree of autonomy in the four districts.
Integration

Employees feel most integrated to the Integrative District and least in the Team organization (see table 2).

<table>
<thead>
<tr>
<th></th>
<th>Team-org</th>
<th>Integr</th>
<th>Learn-org</th>
<th>Ordinary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integration with district</td>
<td>1.75</td>
<td>1.90</td>
<td>1.84</td>
<td>1.79</td>
</tr>
</tbody>
</table>

Table 2 Feeling of integration with the district, for each of the four districts.

Leadership

The manager of Learning Organization is spending much time on transformation, i.e. formulate and disseminate ideas and visions and the manager of Integrative organization on integration, i.e. on social interaction and co-operation (see table 3).

<table>
<thead>
<tr>
<th></th>
<th>Team-org</th>
<th>Integr</th>
<th>Learn-org</th>
<th>Ordinary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of manager spent on:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reproduction</td>
<td>5.70</td>
<td>5.37</td>
<td>5.34</td>
<td>4.89</td>
</tr>
<tr>
<td>Transformation</td>
<td>4.89</td>
<td>5.51</td>
<td>5.92</td>
<td>4.98</td>
</tr>
<tr>
<td>Integration</td>
<td>4.52</td>
<td>5.17</td>
<td>4.56</td>
<td>4.65</td>
</tr>
</tbody>
</table>

Table 3 Type of leadership of the district manager in the four districts. How much time the employees think the manager spend on different tasks.

5.2. Resource generation

The Ordinary District has less resource generation than the other three (see table 4). Especially the ability to innovate is higher in the Learning Organized District.

<table>
<thead>
<tr>
<th></th>
<th>Team-org</th>
<th>Integr</th>
<th>Learn-org</th>
<th>Ordinary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to adapt</td>
<td>4.39</td>
<td>4.27</td>
<td>4.44</td>
<td>3.76</td>
</tr>
<tr>
<td>Ability to innovate</td>
<td>4.27</td>
<td>4.55</td>
<td>5.12</td>
<td>3.34</td>
</tr>
</tbody>
</table>

Table 4 Degree of resource generation in the four districts.

5.3. Sustainability in the four districts

All four districts have about the same costs for operation per weight volume during year 2002, 40-44 SEK, and 2003, 43-46 SEK (see figure 2). But in 2004 the three districts that made an organizational change have decreased their costs, 38-41 SEK, while the Ordinary District has continued to increase its costs to a bit more than 46 SEK.

Fig. 2. Efficiency, measured as cost for operation per weight volume, in respective district, average per year 2002, 2003 and 2004 respectively.

Customer satisfaction of the pharmacies in the districts has changed differently for different districts (see figure 3). The Team Organization made a great improvement between 2002 and 2003 and stayed at the higher level in 2004. The Integrative Organization and the Learning Organization made a dip in 2003, but came back to higher values in 2004, where the Learning Organization has the highest values of all four. The Ordinary Organization has had a slow but steady increase over the two years.

Fig. 3. Customer satisfaction in respective district, average per year 2002, 2003 and 2004 respectively.
6. DISCUSSION AND CONCLUSIONS

The study has some obvious weaknesses, e.g. it includes only four cases, and the phenomena studied are complex and context sensitive. But it also has strengths. The setting is relatively controlled, including four organizations with a lot in common, but with different organizational structures. The study can be seen as an empirical experiment, where the theoretically based model is tested in reality. Is the model strengthened by the results, or do the results give reasons to question the thinking presented in the theory section?

6.1. Prerequisites needed to be a complex organization

The Integrative Organization has a higher value of Hinders for autonomy than the others. This may be due to concertive control in this district. Low autonomy and high integration in this district may cause unbalance at system level. The Team Organization district may have an unbalance in the other direction; high autonomy and low integration.

The districts with Learning Organization and Ordinary organization have similar scores of medium for both autonomy and feeling of integration, both may have a balance. But there is a huge difference between them when it comes to the time their manager spends on the transformation task.

The results indicate that the Learning Organization has the best prerequisites for complex dynamics and thus for decentralized resource generation. For the other three it is more unclear, it depends on what is most important; autonomy, integration, the balance between them or an urge for bottom-up transformation.

6.2. Existence of resource generation and sustainability

The Learning Organization has the top scores when it comes to resource generation, especially the ability to innovate, but also the ability to adapt. The Ordinary Organization has the lowest scores for resource generation, the other two districts lie in the middle.

The efficiency of all four districts was about the same for the first two years after the organizational renewal of Apoteket AB, but in the third year there is an increased efficiency for all districts except the ordinary organization that kept about the same efficiency. It naturally takes some time for effects on output, after an organizational renewal.

The implementation of a Team-Organization seems to have had almost immediate positive effects on customer satisfaction. The Learning Organization district did not change its operative organization very much and consequently their customer satisfaction is about the same in the beginning, but after two years there is a considerable increase in customer satisfaction, which may be due to continuous improvements initiated by their Learning Organization. The Integrative Organization has a heavy decrease in customer satisfaction in the beginning, which may be due to the renewal being most revolutionary at this district. But in the third year they have almost got back to their initial figures. The customer satisfaction has increased steadily for the Ordinary Organization over the three years. But compared to the changes of the other districts this increase is less pronounced than the decrease of efficiency. They may have bought customer satisfaction at the expense of more costs, most likely personnel costs, per weight of volume.

6.4. Conclusions

The first research question of the paper is “What prerequisites have to be formed by organizations and managers to reach decentralized generation of resources?”. The theory based hypothetical answer was that autonomy, integration and urge for fitness are important. The empirical results strengthen this hypothesis. The three districts that implemented organizational activities towards integrated autonomy all have better resource development than the Ordinary district. The Learning district has the strongest resource generation suggesting that there is better with a balance on system level when it comes to integration and autonomy.

The second research question of the paper is “Is decentralized generation of resources a possible way to reach sustainability in modern work life?”. Both the theory based hypothesis and the empirical results give yes as the answer to this question. The three organizations with higher resource generation have also a better development in efficiency. The picture when it comes to customer satisfaction is more unclear, but at least two of the three have a good development also in this indication of sustainability.

High degree of autonomy and integration, a balance between autonomy and integration at system level and an urge for bottom-up transformation co-varies with a high degree of resource generation. And a high degree of resource generation co-varies with a high degree of sustainability.
References


