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The Quality of Life model as attribute of the sustainability concept

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Introduction:

The Quality of Life (QoL) is a very popular topic, frequently used in the daily discussions of customers and citizens about their personal needs, expectations and requirements, but very difficult to understand, lacking sense which should come from it's quality definition and lacking available measurement which should come from a factual quality control process.
So our paper begins with a theoretical approach about the QoL theme and a survey designing the map of common parts, discriminations and links between QoL, well-being, health, safety, pleasure, and sustainability. As we have been working on quality services, quality products, change management, organisational development and polls, for many years in companies and state offices (the "voice of the customer" method (Griffin, Hauser, Shiba, Lepage)), our laboratory stocks a large data base about QoL's perception, which can be used in this research. A second survey, also used in this research to validate our assumptions, comes from customer's needs and expectations for a pill-maker which offers to our laboratory to study new products and services.

1- Markov model of the Quality of Life concept:

This part, retaking a previous presentation of our research (A. Lepage, Montenegro, September 2005), offers some improvements of our analyses which has been made in our laboratory from this period.

1.1- Previous research in un-linear models for global customer satisfaction:

This beginning of theoretical approach has been made with application on a leisure park and was used to take immediate actions of correction after each appearance of drift of the satisfaction of the customers (Qualisat, deposited method, INPI, A. Lepage). We can confirm, as said by Kano (Kano) , that on all products/services, only 20% of them, classified "explicit expectations" follow a linear answer (see Edvardson, Gustafsson, Enquist about correlation between satisfaction and memory of personal life events). In 1998, an important conclusion presented at the "Assises Nationales de la Recherche en Qualité" seminary, Versailles, France, was that the service quality measurement is reliable in relative comparative results between some similar events, or same event measured in same conditions many time on small detailed topics, but never in absolute value. This lets us to apply Markov models on satisfaction.
The Markov models (Mauldin, Urbanski) were chosen to describe complex global satisfaction phenomena because of their ability to synthesise cross reverse dynamic processes. It is based on the probable position in the time of a real situation between two extreme, ideal, theoretical situations relative to the number of basic team repairer-originators (elementary team members, carrying out routine re-design or repair). It should be remarked that the definition also means: "zero dissatisfaction of the customer, between the moment 0 and the moment T of

analysis", which supposes a measuring instrument, from time 0, and that we have the problem of a previously-established linearity.

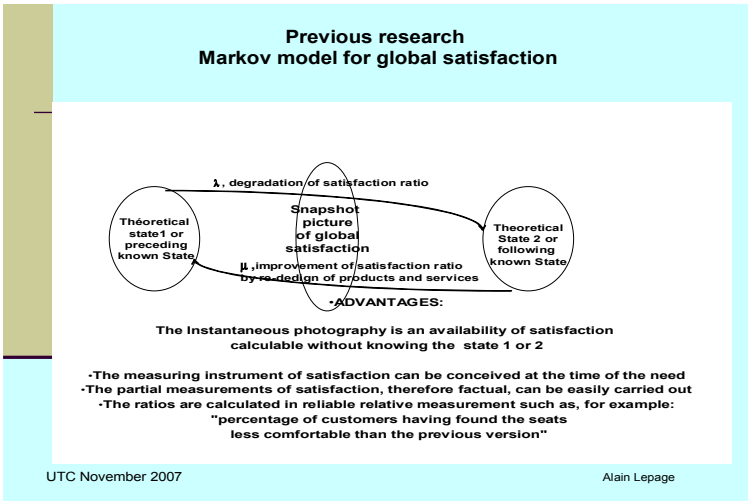

Figure 1: Markov model for global satisfaction (A. Lepage)

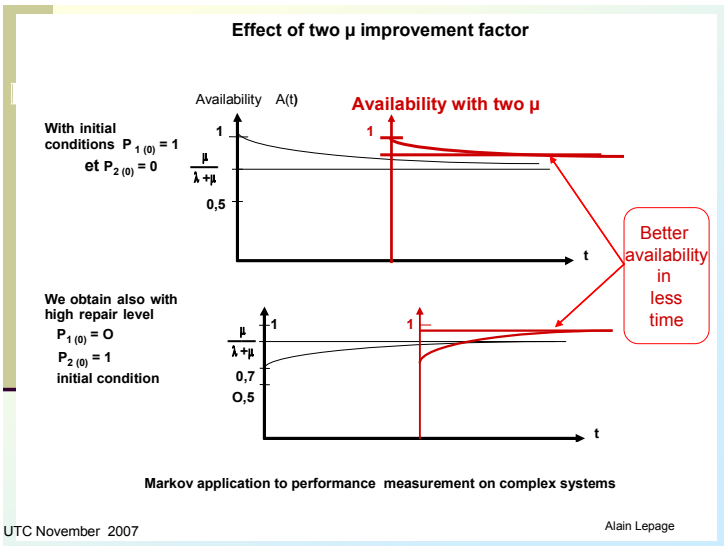

Figure 2: Re-design level of reparation to satisfaction result (A. Lepage)

1.2 – Previous research in un–linear models for political system evaluation:

Here quality perception is the perception of the image seen by citizens when they understand the quality system presented by politicians in their political program, as description of a future proposed to listeners modelled in 2 reverse processes (see figures 3 and 4, and Lepage, TAR journals, 2006). The first process, of sustainability, is made up of many resources, supports and actions which offer citizens a better quality of life. What we define as sustainability is the measure of the quality of the political system, as mentioned in the report on the United Nations Conference on Environment and Development (Landolt, and Agenda 21). A more detailed definition is postulated by Afgan and Carvalho (Afgan): "the measure of the quality of our society is its ability to secure, and not compromise, the right of future generations to have a quality of life, at least equal to that of its own generation". Sustainability is seen here as people's self organisation driven by the desire to obtain the best quality of life, under constraints of financial feasibility and individual and collective safety. However, some authors view sustainability as a measure of quality (Gianpiero, Mayuari, Postar) and others

underline the high level of complexity in the measurement of sustainability (Heylighen). The second process, of safety, concerns the natural effect of self degradation (Levenson), particularly in the case of complex systems, with a worldwide measurement tool, the "World Disaster Report". As the two processes are evaluated with the same approach as the measurement of quality, we can consider that they hold a similar place in the conception of life.

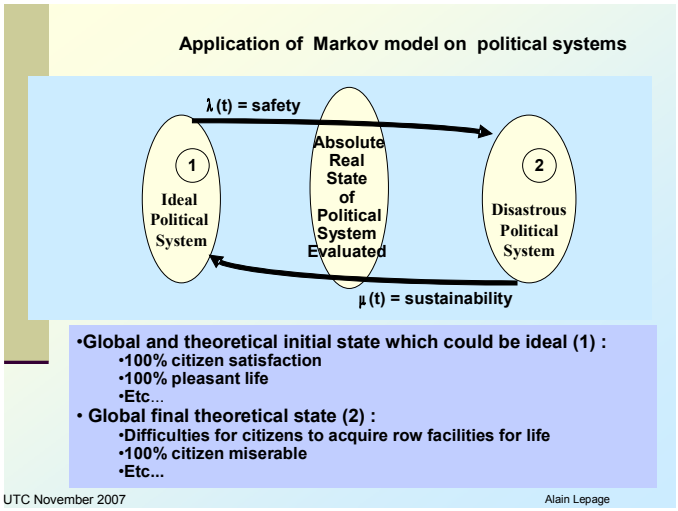

Figure 3: Markov model for political system evaluation (A. Lepage)

1.3 – Markov model for QoL as sustainability attribute in political program:

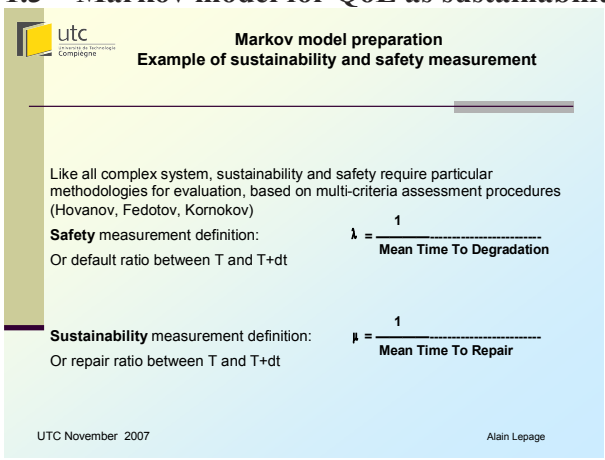

Figure 4: Sustainability and safety position in political system evaluation

The evaluation of the complex processes requires a particular methodology which is always based on multi–criteria procedures. These are well-known as “The multi–criteria evaluation and assessment of complex systems”. An example of this can be found in economics (Hovanov, Fedotov, Kornokov). Our purpose was not to design the relevant criteria for the measurement of sustainability and safety in this previous research. Our interest lies in the use of some of the criteria-elaboration methods which are available in the economic, organisational and systemic areas in order to include them in the Markov calculation.

Also, sustainability offers some tools for its own measurement that we can apply in the current research on health in QàL. Afgan and Carvalho (Afgan) made a synthesis of sustainability with its four components, resource quality, environmental quality, technological quality and social quality.

So, we can give a theoretical description of the links between the principal attributes in the roots representation of the sustainability. One of them, QoL, will be particularly observed in this aggregation roots representation.

2- The concept of Quality of Life:

New approaches came just to confirm our description of QoL as a global satisfaction seen by citizens (ISQUOLS measurement, Cummins). As a common sense, every body could think that happiness would be synonymous of quality of life, or at least the principal attribute of that, having links with health, environment, ..., as proposed by Rogerson (Rogerson) in his study based on Qol in Britain and some European countries.

2.1- The Gross National Happiness:

The Gross National Happiness (GNH) is a definition of quality of life in holistic approach which emerged with Jigme Shingye Wangchuck (Wangchuck) who get Buthan's King powershift in 1972, building an economy that would serve Buddhist spiritual values. The four pillars of GNH are the promotion of equitable and sustainable socio-economic development, preservation and promotion of cultural values, conservation of the natural environment, and establishment of good governance. The measurement of GNH was promoted by some international centres like Genuine Progress Index Atlantic (Rethinking Development) and the Centre for Bhutan Studies. Classical liberal economists attempt to quantify happiness through measurements in consumption and profits (Hayek, Javorski, Friedmann) and sometimes as parameter of sustainable development (Ezechieli). The happiness is a well known and self obvious parameter easy to measure. But what place does it take in an exhaustive structuration of the quality of life's (QoL) description, and which part Health and Human Development in the global QoL calculation does it weigh?

2.2 - Health and Quality of Life:

Based on links between health, medicine and QoL (Pena, in The Economist Intelligence Unit) Measurement of quality of life is used in health with Qualtity Adjusted Life Years (QALYS), and Disability Adjusted Life Years (DALYs). The cost of a treatment is usually assessed by the cost per QALY, or per DALY it produces (Bergner) with links on QoL (Landlot). All the authors relate the permanent confusion in patient perceptions of heath in QoL with well – being. Particularly, they think that health quality of life comprises: happiness, freedom, standard of living .We can read about Pena linearity between physical state of the body and perception of QoL(Netz, Wu).

2.3 – Human Development and Quality of Life:

When the customers and citizens perceive the two concepts as similar, many authors present the distinction between human development and QoL, like Dossa (Dossa) since 1989. That basic qualitative part of human aspect of QoL is the physical one, presented by Morris (Morris) since 1970 as: percentage of the population that is literate + infant mortality rate + life expectancy. Some criticism appears about these qualitative measurements which were affected of a lack in psychological and cultural attributes of the citizen's expression of their human perception of QoL (Hout M., from Russel Foundation, takes qualitative approaches as the most important part of living conditions). We share this point of view across our experience of many people's perception of life surveys, adding that both customers and citizens decide clearly to make a volunteer mix between QoL, well - being, human being, happiness and family social uses which we experimented as attributes of global QoL.

2.4 – Aggregation for Quality of life’s measurement:

We can find a schedule of Quality of Life description and measurement in the Quality-of-Life index (The Economist Intelligence Unit) elaborated in The Economist Intelligence Unit, and calculated on a unique methodology that links the results of subjective life-satisfaction surveys to the objective determinants of quality of life across countries. The index has been calculated for 111 countries for 2005. We have also a multicriteria model of QoL measurement proposed by Massam (Massam). Life satisfaction is seen as a judgment that

depends on social and culturally specific frames of reference. Based on the QoL index, researchers validate nine QoL factor's indicators for their reliability:
- Material well-being (we have complete studies about global happiness (see Diener E.) and happiness attributes in material well – being (see Frey, Stutzer), with an economical approach. Often it is question of gdp per person, at ppp in $ (Economist Intelligence Unit) beside other well – being indicators (Kahneman and Schwarz).
- Health (life expectancy at birth, years. Source: U.S. Census Bureau).
- Political stability and security (source: Economist Intelligence Unit).
- Family life (divorce's rate per 1,000 population, converted into index of 1 (lowest divorce rates) to 5 (highest) (U.S. Euromonitor(see Desabled Family)).
- Community life (Vias and Carruthers worked on country geographical and regional factors of development versus QoL). We can also use the Dummy variable taking value 1 if country has either high rate of church attendance or trade-union membership; zero otherwise (I.L.O.World Values Survey).
- Climate and geography (latitude, to distinguish between warmer and colder climates (C.I.A. World Factbook).
- Job security (unemployment rate,%)(Economist Intelligence Unit; I.L.O)..
- Political freedom (average of indices of political and civil liberties. Scale of 1 (completely free) to 7 (unfree))(Freedom House).
- Gender equality (ratio of average male and female earnings).

These factors come with their definition and their survey source. We can see that the significant attribute 'happiness" which we presented in part 2.1 is the agglomeration of 2 determinants of the index: material well-being and health. This is a major observation to understand what the customer's common cognitive statement is at the time of interviews that we made about perception of QoL. Indeed, our "manual" approach, presented in the part 3.1 shows that customer's survey about QoL make automatically a self mix between health, material well - being and happiness.

3- Comparison of QoL definition from theoretical approach to citizen's perception:

We can offer data analyses from two surveys. The first one analyses the QoL with a "voice of the customer" method (Griffin, Shiba, Lepage) applied in 2007 on French people questioned on their perception of actual life and their future desired. The second one is in concern with QoL measurement on a panel of medicine clients. We were in charge of catching their needs and design pills and health services as good answer.

3.1 – QoL perception from a panel of citizens:

We can give under the major results of the citizen's survey structured with the Kano (Kano) method. We made semi-direct interviews to establish the best questions seen by the people which were proposed in Kano questionnaire.

	A	P	O	I	C	D
Q1			44,4	11,2		44,4
Q2	77,8					22,2
Q3	44,4			11,2	11,2	33,3

A=attractive, P=proportional, O=Must Be, I=indifferent, C=Reverse, D=questionable.

Q1 is a question about environment protection respected by State and companies. It comes with under – questions on air and water pollution, environment standards respect, and innovations for cleaning the production process. We can see that Q1 is a Must Be concept of QoL.

Q2 is a question about better individual incomes allowed by CEO and politicians. It comes with under – questions on salaries in companies, retirement cost and health cost, and better

life at work with a lower stress level. We can see that Q2 is clearly an attractive concept of QoL.
Q3 is a question about individual liberty and good education. It comes with under – questions on autonomy with thinking and speaking liberty, better education programs in schools and universities, and better relation between education programs and professional capacities needed in companies. Q3 is also attractive. On the figure after, we can see the Kano answers to positive and negative under questions (A to C):

Les attentes des clients → / Présence de la fonction ↓		Absence de la fonction				
		1. Me plait	2. C'est normal	3.m'est égal	4.M'en contente	5.Me déplait
	1.Me plait	D A2-A3-A4-A6-B4-B5 C3-C4	A C7	A B6-B87	A B1-B2-B3 B7-B9	P C1-C2-C5
	2.C'est normal	C	I C8	I	I+ C97	O A8
	3.m'est égal	C A7	I	I	I	O A1-A5-A9
	4.M'en contente	C	I	I	I	O
	5.Me déplait	C	C	C	C	D C6

During the "One – On – One" interviews of the "voice of the customer" method we were allowed to observe exactly the same confusion phenomena which we detailed in the theoretical approach, between QoL, well – being, happiness, health, and political future.

3.2 – QoL measurement in the health field:

We could offer some global results of the customer's, citizen's and health expert's perception which we have in data base from the study ordered by the company making pills and health services. As there is confidential constraint, we offer public results which are closed to our observations from the company's clients:

	Coefficient	Standard error	Statistic Value
GDP per pers	0.00003	0.00001	3.5247
Life Expectar	0.0448	0.0106	4.2299
Political Free	-0.1052	0.0561	-1.8749
Job Security	-0.0217	0.0099	-2.2062
Family Life	-0.1878	0.0640	-2.9349
Climate and C	-1.3534	0.4691	-2.8852
Political Stab	0.1519	0.0520	2.9247
Gender Equa	0.7423	0.5428	1.3676
Community L	0.3865	0.1237	3.1255
Constant Sta	2.7959	0.7890	3.5435
Multiple R: 0.919		Adjusted R square: 0.823	
Standard error: 0.482		Nb observations: 74	

Table I: Global importance of QoL attributes (The Economist Intelligence Unit)

Composant's weight in QoL	Eco Survey	QoL Index
Material wellbeing	11.5	18.8
Health	15.0	19.0
Family relations	14.3	11.3
Job security	11.9	7.7
Social and community activities	10.9	12.2
Political freedom and security	25.3	26.2
Gender equality	11.1	4.7
	100.0	100.0

Table II: Weight of different components of QoL (The Economist Intelligence Unit)

We can present here after an extraction of the world wide survey made by governments up on the QoL of the 111 countries concerned:

	QoL	Rank	GDP/person	Rank	Rank gap
Ireland	8.333	1	36,79	4	3
Switzerland	8.068	2	33,58	7	5
Norway	8.051	3	39,59	3	0
United States	7.615	13	41,529	2	-11
Canada	7.599	14	34,15	5	-9
France	7.084	25	30,64	18	-7
Germany	7.048	26	28,25	21	-5
Slovenia	6.986	27	21,892	28	1
United	6.917	29	31,15	13	-16
China	6.083	60	6,27	74	14
Nigeria	4.505	108	960	110	2
Tanzania	4.495	109	672	111	2
Haiti	4.090	110	1,47	107	-3
Zimbabwe	3.892	111	1,5	106	-5

Table III: worldwide quality -of - life index, U.N.

The question coming at this presentation of the results, knowing that those of our customer's/citizen's survey are exactly the same, concerns the consequence of reasonable, stable and poor factors like GNP, material well-being, security. We can deplore the lack of positive and dynamical aspects such as risky personal projects, brightness in daily life.

Conclusion:

We theoretically described in the second part of our study, the classical confusion made by customers and citizens on Quality of Life with its components like health, well – being, happiness and physical aspects of life. The conclusions are confirmed with the customer and citizen surveys which we made on the global QoL perception and on health approach seen by final users of medicines. The fist part analyses the efficiency of the Markov model twined with the aggregation method to calculate and measure the Quality of Life.

The validation on the two applications, French citizen's perception of QoL, and customer perception of QoL in the health services field, offers some validated results:

- Some confusion between the concepts (QoL, happiness, well – being, health) in the same way which explained in the theoretical part;
- Impossible to measure the global QoL directly if we expect to work with a good reliability;
- It is possible to measure each attribute of the QoL, as positioned under QoL in their roots representation together, with a very good reliability and with sense;
- We have firstly to calculate the intermediary process of sustainability (like the safety one), from the detailed attribute's measurements, with the aggregation method;
- We have finally to calculate global Quality of Life from the sustainability and the safety processes with a Markov calculation model.

Perhaps could we have an opportunity, for the first time, to make a study of the multitude of attributes elaborating the Quality of Life and interfaces between each of them, allowing us to make a better measurement of global QoL, in order to determine exhaustively concepts like health or Quality of Life? Such emergence allows our laboratory to preview further works about the complete evaluation of Quality of Life.

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