

The Colors of Quality - A Comparative Study of Cultural Differences and their Impact on Quality Criteria

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There is a cultural dimension affecting what constitutes quality criteria and this may bring considerable consequences for evaluation of quality. The current study is examining the mentioned problem and our case is extracted from the fishery industry. Quality is an essential issue for trading, processing and consuming fish. However, the criteria of fish quality is often different and it depends much on the users preferences. The study analysis was based on three comparative fish evaluations undertaken through sensory tests in Norway, Tanzania and China, respectively. Same fish samples were evaluated by the local sensory experts from these three countries. The criteria of fish quality and their preferences, such as taste, smell, texture, colour in grade of intensity are compared in the study. The study findings showed both similarities and differences on the preferable criteria of fish quality among these local experts. The study concluded that cultural differences and their impact to quality criteria are significant by different users and their cultures. The study suggests that local condition-based quality criteria should be emphasized during a quality implementation process, and the similar criteria should be applied in an overseas business situation when undertaking quality improvement.

The criteria of quality is an interesting topic for many scholars and researchers, and they seem never to agree on one unique answer. However, most people believe that quality criteria are not the same for everyone and they can be changed at different time periods. The history of quality shows a potential change on criteria which developed from relatively objective and technique based measures to subjective and need based measures, concluded by many teaching books of quality management (Aune, 1993; Gitlow *et al.*, 1995; Tenner and DeTore, 1992).

This development also implies the change of the referees for the quality criteria who switched from producers to customers. (Feigenbaum, 1986; Ishikawa, 1985; Jersin, 1984) stated that consumerism plays more important roles for the daily life. As an increasing number of business companies appeared in the international market, the buyers are coming in to take a more powerful position for determining quality criteria. Good quality is a very essential factor for companies to keep their customers, and quality must meet customer requirements.

Juran (1989) defined the modern quality philosophy as "fitness for use". Hence, the users or customers will have the first priority to choose the quality criteria. However, this approach may also contribute to the diversification of criteria because the users or customers may presumably require different needs and their aspect on quality may not be the same.

Connel (1990) indicated that in the fishery industry, the need for healthy contributions is a very important aspect for the fish quality in the developed countries. The quality inspection often focuses on the micro-level as microbiological control where the degree of contamination is assessed. On the other hand, in the developing countries, the utilization and nutrition aspects are rather important for the users. The quality inspection often emphasizes on reducing waste and so improving nutritional status. The differences of quality criteria here are the measures of biological contents against the measures of physical weight.

Also, the criteria of quality can be quite different from one person's opinion to another, and it can be much affected by

person's cultural backgrounds. For example, it will be difficult to evaluate the quality of a fish dinner only by reading the menu or taking some physical measures. The quality must be evaluated by the people who have tasted the dinner and it is a great chance for the different evaluations by the different people, simply because people have different taste. For the same cod, one person may like to eat the cooking cod, another one prefers the grilled cod, and perhaps the third one rather uses a lot of spice and oil to fry the cod. It will be impossible to compare the measurable quality of dinner for these three dinners, because they use different criteria. By their own taste and preferences, everyone is able to claim their own dinner (the way of preparing cod) represents the best quality.

An interesting point here is that everyone uses their own criteria to evaluate the quality of a fish dinner, and this self-determined criteria may occur in many cultures. Ronen (1986) defined the term culture as "every human groups or communities have own knowledge, beliefs, art, law, morals, customs and other acting frames which are distinguished from other groups or communities". The knowledge of a fish and its preparing ways, belief of the best quality and customs of eating fish are quite possibly different from one group to the others and appeared as a culture. Hofstede (1983) argued that a group can size so small as a family with few people and large as a religious conglomeration with many countries. The cultural affections on quality criteria and preferences are also quite different and much depended on group sizes and power (Wu, 1995). The current study is designed to study how powerful cultural affections may be on determining the quality criteria for a fish.

Method and results

The primary goal of the current study is to identify which cultural dimensions have an effect on the quality criteria through an example from the fish business. As other products, the quality of a fish is a crucial issue for everybody in this business. Freshness seems to be the most important criterion for buyers. Generally, it seems to be hard to

recognize further scientific value if the freshness is only evaluated by common sense and experience. It needs more attributes to indicate the quality in the scientific terms. Connel (1990) introduced a number of professional methods of assessing fish quality and some can be mentioned as sensory methods, mechanical, instrumental and laboratory methods, as well as microbiological methods.

The current study will focus on the sensory method. The philosophy of such a method is to measure several groups of parameters, such as smell, taste, grade of shining, colour and texture (Gorga *et al.*, 1988) and quantify them in scores by sensory referees, usually experts or trained persons. The quality of a fish will be evaluated through a calculation on these scores. The general requirement is to measure the parameters as objectively as possible.

Nevertheless, even the most objective design of this method may not be able to provide an absolute objective measure because there are people who involved in the process and their evaluations may be culture dependent. The processes and results of a sensory test may possibly be deviated by such cultural differences. The current study is designed to locate such deviations, by comparing the sensory scores, the evaluations and the process of a sensory test. The cultural dimensions and their impact to the quality criteria are presumably revealed through such deviations.

Three sensory tests were undertaken in Norway, Tanzania and China. There were two types of samples taken to the three tests. Both were stock fish (cod) - Prima and Sekunda, as classified by Norwegian fish quality standards. The fish needed to be hydrolysed by dissolving the samples in the fresh water 5 days before the test. Then the fish samples were cooked at the temperature just below the boiling point. All three tests undertook the same hydrolysing and cooking process. In addition, one group of measures in Tanzania were taking for the samples which were steamed 15 minutes longer than others. Hence, there were two groups of measures in Tanzania, as one standard cooking and one steamed cooking processes against two types of stock fish. In the Norwegian test, there were six groups of measu-

res as early (dry) hanging and late (dry) hanging, each with fresh, elder and frozen (altogether 12 samples). In the Chinese test, there was no special classification for the samples. For all three tests, each sample was tested twice in order to secure the measurement.

The local sensory referees were told to give their evaluations on the fish by scores. The sensory parameters were chosen by their own preferences. Hence, the parameters for the test in each country may not be the same. However, the study focuses primarily on the comparative results (in distinguishing Prima and Sekunda fish) within three countries, so that such different usage

usage of parameters may not affect much to the study findings.

The measures were analyzed by ANOVA - Analysis Of Variances test. The results are shown on table 1. Dependent variables as smell, taste, texture, firmness, etc. were tested against the independent variables as ways of preparing fish, cooking processes and types of fish (Prima vs. Sekunda). The Norwegian sensory test and ANOVA analysis were conducted by another research team and results were published in their report (Nyvold *et al.*, 1996) The Tanzania test was carried by the personnel at Mbegani Fisheries Development Center, and the Chinese test was conducted by the Faculty of Food Science at Shanghai Fisheries University.

Table A ANOVA test results on stock fish

<i>Parameter/country</i>	<i>Norway (N=6)</i>	<i>Tanzania (N=4)</i>	<i>China (N=14)</i>
Smell of stock fish	ns	ns	nm
Smell of acid	ns	ns	nm
Smell of pork fat grilled	nm	ns	nm
Smell of Ammoniac	ns	ns	nm
Grade of shining	p<0.05	p<0.05	nm
Yellow colour	p<0.001	p<0.05	nm
Lightness	p<0.001	nm	nm
Taste of stock fish	ns	ns	nm
Taste of saltiness	nm	ns	nm
Cloying taste	ns	ns	nm
Taste of grilled fat	nm	ns	nm
Flaking	p<0.05	ns	nm
Firmness	ns	ns	nm
Elasticity	nm	p<0.05	nm
Cohesiveness	ns	ns	nm
Juiciness	p<0.05	ns	nm
Fibrousness	ns	ns	nm
Chewingness	ns	ns	nm
Texture	nm	ns	nm
Flavour	nm	ns	nm
General Taste	nm	nm	ns
General mouth feeling	nm	nm	ns
Favourable grade	nm	nm	ns

Note: nm - not measured, ns - not significant

The Norwegian results were printed with permission from: Nyvold, T. E., Sørensen, N. Kr., & J. G. Helgason. (1996): "Sensorisk Analyse av Tørrfisk fra Ferskt, Gammelt og Fryst Råstoff". Arbeidsnotat, no. 3447, SIF, Fiskeriforskning

The following observations are noted from table 1:

- The choice or preference for sensory parameters was almost the same for the

tests in Norway and Tanzania, but was different option for the test in China.

- *Grade of shining* and *Yellow colour* are the only parameters that have significant measures for tests both in Norway and Tanzania. However, the same parameters were not chosen for the test in China.
- *Lightness*, *flaking* and *juiciness* are the appreciable parameters for the Norwegian test. These parameters gave the significant measures.
- *Elasticity* is an appreciable parameter for the Tanzania test. It gave the significant measures.
- Most of measures are not giving the significant results (totally 20 *ns* out of 28 measures).
- The test in Norway has the most number of significant measures, while fewer for Tanzania and none for China.
- A close analysis on these significantly different measures for the tests in Norway and Tanzania shows the differences were rather distinguished by the ways of fish preparation (fresh, elder, frozen or cooking processes), not by the types of fish.

A summary of comments from the test in China stated that most of sensory referees evaluated the fish as tasteless or slightly tasty (13 answers out of 14 in total), good elasticity in mouth feeling (9 answers out of 14 in total). Most referees in their general comments on samples considered the fish as very good in quality, however only as a raw material. It seems that the Chinese referees prefer to evaluate the fish under a more salted condition (as they suggested that the further tests should add a little salt in the cooking water). There is one criterion they wished, but lacked significantly for these fish samples, and that was smell of fish aroma (4 answers out of 7 in total).

Inspections to these sensory laboratories also showed the differences of implementing procedures. Though every laboratory has the international standard for the procedures of a sensory test, it is not apparently applied in every laboratory. Only Norwegian tests follow up the standard completely. The other two laboratories were less conformed.

To summarize the measurable outcomes above, the following similarities and differences are given:

- Similarities: There is no significant measures on types of fish, which indicates that none of the tests in these three countries was able to distinguish the differences between two types of fish Prima and Sekunda. *Grade of shining* and *Yellow colour* were the only appreciable measuring parameters for the tests in Norway and Tanzania.
- Differences: The choice or preference to the use of sensory parameters was different for the test in China, compared with tests in Norway and Tanzania.

The question is: How can these similarities and differences be explained by cultural affections?

Discussions

As mentioned, the number of significant measures and the choice of using sensory parameters are both noticed differently for each country in the tests. For the measures, Norway has the most significant measures while Tanzania fewer and China has none. For the choice of sensory parameters, Norway and Tanzania used the more detailed and divided parameters while the test in China used more general and integrated ones.

One aspect in the theory of cultures is individualism versus collectivism. The common belief is that the differences between Oriental and Occidental cultures may be measured by the degree of individualism and collectivism. Hofstede (1983) concluded that Norway is highly associated with Occidental cultures scored also among the highest on the scale of individualism. It is a common belief that China represents Oriental cultures and the Chinese cultures are dominated by collectivism.

The differences of mental values in individualism and collectivism may also affect the ways and degrees by which people judge the sensory samples. The Norwegian individualism has the most number of significant

measures since the Norwegian referees appreciate much to the accuracy on one individual measure. On the other hand, the Chinese collectivism may explain why the test in China had no significant measure on any one individual parameter because the Chinese referees may prefer to test fish rather in a holism aspect than counting isolated single measures. This cultural difference may also explain why Norwegian test used the more detailed and divided parameters while the test in China used more general and integrated ones.

A comparative study of fish recipes between Norway and China (Wu and Midling, 1995) indicates also a clear distinction in the use of spices between these two cultures, as Norwegian dinners use few types and Chinese ones use more types. This implies that the Norwegian food culture is based on simple, but clear taste while the Chinese is based on complex, but diffused taste which may be reflected on the differences in sensory criteria as divided versus integrated parameters.

These differences are also revealed by the test conditions between these two cultures, as pure for the Norwegian and salt wished for the Chinese, though the real test condition was also pure for the Chinese test. Another affection of such differences to the sensory test can be on evaluations: The simple and clear taste is easy to be measured objectively and the complex and diffused taste has to be evaluated subjectively.

According to Ronen (1986), the degree of individualism for East Africa where Tanzania is located is in somewhere between Norway and China (indicated by the previous measures in other Chinese culture groups as Hong Kong and Taiwan). The number of significant measures in Tanzanian tests is also in between Norwegian and Chinese. These observations illustrate an interesting and potential causal relationship between the degree of individualism and number of significant measures in sensory parameters.

One interesting study finding is that none of the tests was able to distinguish between the two grades of fish - Prima and Sekunda. This result also implies that for whatever cultures of these three countries, it is no need (or not able) to distinguish the types of

fish in Prima and Sekunda, by chosen sensory parameters. In practice, this may contribute to the utilization of fish products and substitution of demanded fish types.

Grade of shining and *Yellow colour* were the only appreciable parameters for the tests in Norway and Tanzania. It is interesting to notice that both parameters are defined as visibility measures. It is therefore reasonable to consider visibility as an important dimension for a sensory test in these two cultures.

It is also interesting to notice that the ways of fish preparation (fresh, elder, frozen or cooking processes) are able to give the significant measures in sensory tests rather than types of fish do. The further study suggests therefore to focus more on the comparative analysis by different ways of fish preparing, which outcomes may be able to benefit the product development for the fishery industry. The similar potential was observed for the Chinese tests, as many local sensory referees indicated their wishes to a more salted condition, which could also be considered as a way of fish preparation.

The power and influences of a culture is much dependent upon the size and appearance of this cultural group (Wu, 1995). When distinguishing the sensory criteria and measures from these three cultures, it is interesting to notice that the Chinese test was much different from the Norwegian and Tanzanian tests, both in choice of sensory criteria and in the final measures. Perhaps this distinction can be explained by the influences of a strongly tradition based Chinese culture?

The processes and observations from these three sensory tests represent the following philosophies:

- The choice or use of measurable parameters for a sensory test illustrates mainly a referee's *subjective* preferences of quality criteria, thus the criteria which will be used to decide the quality. For instance, one may choose the colour, smell and firmness as the most appreciable criteria, while another may prefer taste, elasticity and texture.
- On the other hand, a group of measures with results of scores accounting from a test may presumably and wishfully give

the *objective* evaluations. However, the cultural affections are still unavoidable in a such case because the scores are accounted by people who may give the different scores on the same observation. For instance, one culture may give score 5 to indicate “acceptable smell”, another culture may give score 7 for the same smell. Since people may sense the same smell differently and such a difference is mainly culture based, there is no good reason to believe that people with different cultures will score the same smell by the same score.

ways of preparing fish seem to play a more important role than the types of fish for sensory tests.

It seems that quality criteria are much dependent upon the local conditions. Though the same standards were used for the Norwegian and Tanzanian tests, the sensory results showed somewhat different parameters or criteria were appreciated by the local referees from these two countries. Hence, the further design for a sensory test in any country should focus closely on the local preference for the parameters or criteria for quality measures and their relationships with cultural changes.

Conclusions and further recommendations

The comparative study on the sensory tests in three countries suggest the following cultural dimensions that affecting the fish quality criteria:

- Collectivism and holism values dominate the Chinese tests so that their choice of sensory standards and parameters was few and more general related.
- Individualism and values dominate the Norwegian tests so that their choice of sensory standards and parameters was many and more detailed.
- The degree of visibility is essential for the test criteria for tests in Norway and Tanzania.
- The customers culture may affect more directly on the fish preferences as the

Based on the current study findings and their conclusions, the changes of cultural dimensions and their quality criteria can be suggested as a function of individualism against collectivism. Table 2 shows their degree of change and variances of quality criteria. A further study should focus on finding more quality criteria (other measurable parameters) which are related with degrees of individualism and collectivism, and identifying their causal relationships with this cultural dimension.

The ways of preparing fish seem to play a more important role than the types of fish for sensory tests. This observation may imply that local users appreciate more on the processes of fish rather than the types or classes of the fish. However, there is a need for more fundamental sensory tests to confirm this hypothesis.

Table B The Changes of cultural dimensions and their quality criteria

<i>Comparison\country</i>	<i>Norway</i>	<i>Tanzania</i>	<i>China</i>
Culture	Individualism	less	Collectivism
Choice of criteria	Many	Many	Few
Significant measures	Many	Fewer	None
The test conditions	Pure	Relatively pure	Salt wished
Evaluations	Objective	Middle	Subjective

The recommendation for a further study will be focusing on identification of more special quality criteria and preferences among the three countries. Methods and sensory standards from each country should be switched

and tested against each other. It will also be interesting to use the factorial analysis to extract the specific parameters or criteria for the countries. The ways of fish preparation before the test are also important quality

criteria and it will be interesting to analyse their different alternatives and their causal relationships with cultural differences.

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