

POTENTIAL RYE BREAD CONSUMERS

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Abstract. In the world, bread production is one of the industries in which new, more productive technologies and engineering solutions are introduced as well as traditional wood-fired bread-baking ovens for mass production are reintroduced. Consumers become more fastidious, desirous of innovation and want to return to traditional products. Producers have to choose the niche with the highest demand for products, for instance, healthy food. The research aim is to compare consumer behaviours in the context of bread consumption between Latvian and German youths. Methods: a longitudinal sociological experiment in Latvia and a sociological sensory experiment in Germany; an expert evaluation; a sociological survey for characterising respondents. Students from all continents study in Germany. Respondents from seven countries (five outside Europe) participated in a degustation of various kinds of rye bread. In the result, new ideas emerged how to globalise Latvia's original product – rye bread: not only finished products but also raw materials, technologies or technical solutions can be sold.

Keywords: bread industry engineering, young consumer, rye bread.

Introduction

Although bread baking is one of the most ancient professions, in the world, bread production is one of the industries in which new, more productive technologies and engineering solutions are introduced as well as traditional wood-fired bread-baking ovens for mass production are reintroduced. Consumers become more fastidious, desirous of innovation and want to return to traditional (organic) products. Yet, bread consumption dramatically declines in Latvia and Europe. Besides, the population of Latvia has decreased by 16 % over 20 recent years. For this reason, competition among bread producers rises. Producers have to choose the niche with the highest demand for products, for instance, healthy food, and maybe this niche has to be chosen outside Latvia and Europe. Rye bread is an excellent energy source. Its components improve teeth health, optimise the performance of the digestive tract, normalise cholesterol and sugar levels in blood and prevent from heart and blood vessel diseases. Rye bread in Latvia is a traditional kind of bread of excellent quality, as climatic conditions in Latvia are suited for producing rye of excellent quality. Rye bread with fruits and nuts is a much demanded delicacy in Latvia, while foreigners are surprised of combining rye and fruits. The world is becoming increasingly globalised, and we receive culinary influences from different parts of the world [3].

Finns who are concerned about their health avoid white bread but seem not to associate rye bread with a healthier lifestyle [4]. From a public health perspective, there is a need to increase the consumption of rye and whole grain, especially among young adults. According to the Swedish National Food Agency's overall results on bread consumption, the youngest (18-30 years) age group reported significantly less bread compared to middle age groups [3]. Studies from Finland have shown that a higher intake of rye bread was associated with lower occupational social class [5]. Neither white nor rye bread was associated with a healthier lifestyle but white bread was associated with an unhealthier lifestyle [4]. In Australia, white bread has been eaten more often by consumers with less education, but also by young consumers and consumers with children [9]. Development of more sensory attractive rye bread and eating-out types is thus challenge and should be in focus in further studies [3]. Trends in the world are identified by scientists, while companies examine consumer ratings from the consumer satisfaction perspective [2].

The research aim is to compare consumer behaviours in the context of bread consumption between Latvian and German youths.

The research tasks are as follows:

1. to analyse the most important aspects of youths' choice of bread;
2. to identify and compare the attitudes of German students to Latvian traditional rye bread products;

Youths are more innovative and open towards new and untraditional products. They are not afraid to experiment, taste something new and, by changing their habits, maybe even find a business niche.

Target groups for health communication should be younger age groups [3]. In this case, research limitations involve young consumers – students–, so that they get familiarised with innovative products and can recognise traditional and healthy rye bread products, which can later serve as the basis for a future greater research study. According to consumer behaviour theory, consumer loyalty can be influenced, and only consumers' satisfaction will determine whether the consumers are going to buy a product again. Even though positive experience does not guarantee the loyalty of consumers, a chance that consumers stay loyal to a company depends on the extent of their satisfaction. Consumers' satisfaction depends on the quality of a product. It also depends on consumers' expectations [10].

The loyalty of Latvia's consumers to particular brands or producers is higher than on average in Europe. According to the survey of consumers, higher consumer loyalty to particular producers as well as higher behavioural loyalty may be observed for dairy products, bread and grain products [8]. Surveys of consumers in the USA and studies conducted by the European Commission suggest that the main factor affecting the choice of food by consumers is taste (quality), and only then followed by price. In the EU Member States, on average, 96 % of consumers consider quality an important, – factor in their choice of food; the role of the price is less important [6; 7].

No matter how it is in marketing or consumer behaviour studies, economics uses the term utility – the quality of usefulness, which satisfies consumers' needs. Utility may be measured in two ways: cardinal and ordinal. CARDINAL utility means a subjective opinion of consumers if comparing some goods in terms of numerical value. The utility of goods is rated subjectively by comparing the utilities of various goods. A difference in the goods, which has to be measured, is determined, namely, expressed in terms of numerical value. ORDINAL utility refers to a subjective rating by consumers when determining the preference of a good over other goods. In measuring ordinal utility, the utilities of goods are subjectively compared and arranged by utility level. The preference of one benefit over the other ones is determined. Measuring ordinal utility is based on determining consumers' subjective preferences [11].

Materials and methods

The present research conducted:

1. a longitudinal sociological experiment with new consumers and at the same time an evaluation of the same product by three professional experts in Latvia;
2. a sociological sensory experiment in Germany, and
3. a sociological questionnaire survey aimed at characterising the respondents (in Latvia and Germany).

The respondents were asked about their bread consumption habits, how often they eat bread and how they choose the bread, such criteria as the external appearance, smell and taste of bread, the presence of additives and dough enhancers, expiry dates, price, whether the packaging of bread is important and whether bread has to be sliced as well as the weight of a bread loaf to be purchased.

All of them were asked to taste various sorts of rye bread. The students in Germany tasted traditional Latvian dark bread baked in the hearth, rye sweet-and-sour bread (fine rye bread) and rye bread with fruits and vegetables. Each sort of bread had to be rated on two scales: the ordinal and cardinal bread utility scales. The respondents were offered a 7-stage hedonic scale: 1 – very good, 2 – good, 3 – slightly good, 4 – indifferent, 5 – slightly bad, 6 – bad and 7 – very bad (cardinal utility ratings) to evaluate the degree of satisfaction with the bread. After samples of all the sorts of bread were tasted, the respondents were asked to rate the ordinal utility of bread – it was an arrangement test – by arranging the samples from the tastiest one to the vapid one. For the Latvian students, the samples of bread were encrypted with a three-digit code, while for the German students the samples were arranged in the following sequence: rye bread, rye sweet-and-sour bread and rye bread with fruits and nuts.

The same sorts of bread, which were supplied by two bread producers in the day of baking, were offered for degustation to the Latvian students three times at an interval of a month in the same day-of-week and in the same hour (9.30 a.m.). Since the sensory rating of bread was performed several times, each rather was assigned a code by which the rather was recognised. Three professionals who were

tested for taste sensitivity and were aware of the rye bread production technology participated in the sensory rating of bread quality. The ratings by the experts were not known to the group (consumers) performing the sensory rating of bread samples.

The students in Germany– three various groups – tasted the same three sorts of bread in two days. Since the bread was brought from Latvia, completely fresh bread samples could not be provided each day, and it slightly influenced the scores of voluntary replies.

Results and discussion

The study on youths' attitudes to bread and the bread degustations (sensory rating) were conducted in Latvia in October, November and December of 2014 and in Germany in February of 2015. The youths were asked about their bread consumption habits, writing down the most important factors in their choice of bread. In Latvia, replies were given by 18 students of the Latvia University of Agriculture (LLU), in Germany by 30 students of the Fulda University of Applied Sciences from Germany (24), Indonesia (2), Brazil, Salvador, Vietnam and Saudi Arabia. The students in Germany were aged 19-29 (one student was 59 years old), while the Latvian students were 20-25 years old. The longitudinal experiment in Latvia was performed in a group of consumers, which consisted of 23 raters, of which 9 were women and 14 were men; their average age was 20.7 years. The respondents tasted and rated 6 rye bread samples from two bakeries three times in the same hour at an interval of a month.

During the process of evaluation, the Latvian experts found a few defects, for instance, burnt bread crust, the width of bread slices was not equal (one end of the slice was thicker) as well as the soft part of bread was sticky in two bread sorts in the third evaluation; however, the students did not know that.

Performing the arrangement test for six bread samples three times at an interval of a month, the results were different. In three evaluations, one and the same individual rated the samples of the same bread sorts differently, while the others presented stability in their ratings. The most unambiguous ratings were given by the consumers and the experts to two out of the six sorts of bread, which showed that consumers appreciated the quality of bread. They could also forgive mistakes at least once, as it was with a popular bread sort that had no sufficiently high quality in the third evaluation, but the consumers did not rank it in the last place.

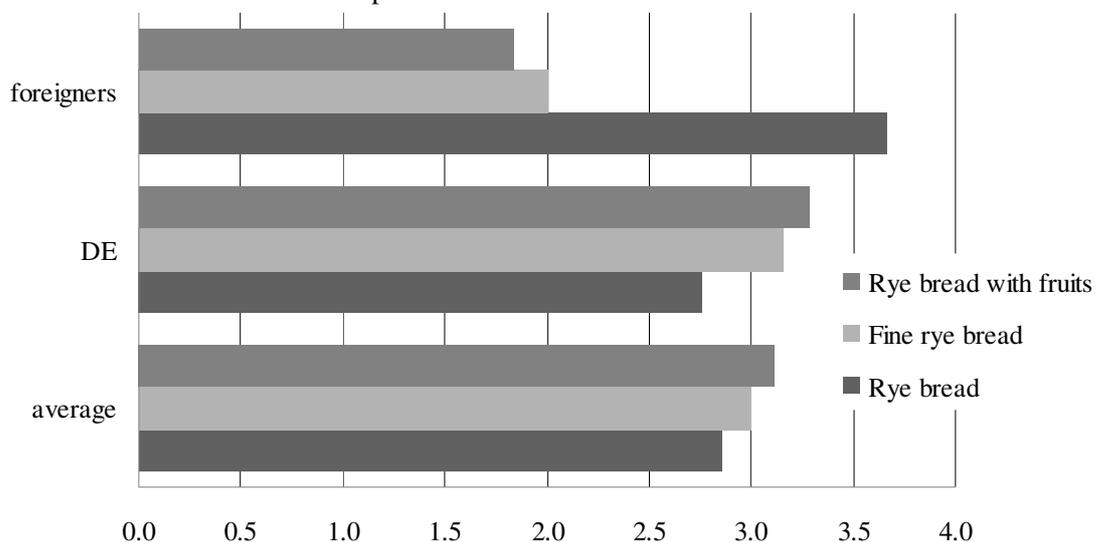


Fig. 1. Results of the degustations of Latvian rye bread by Germans and foreigners in Germany ($n = 30$): 1 – very good; 2 – good; 3 – slightly good; 4 – indifferent; 5 – slightly bad; 6 – bad; 7 – very bad

The respondents in Germany rated the rye bread sort on a 7-point hedonic scale: 1 – very good and 7 – very bad. On average, the lower the score, the more the bread is preferred. Among the foreigners (students who came from the Middle East, Asia and Central and South America), the highest ratings were given to the rye sweet-and-sour bread with fruits, and the sweet-and-sour bread

was ranked second. Among the foreigners, the dark rye bread was the least preferred. In contrast, the Germans preferred the traditional rye bread without additives, whereas the rye bread with fruits was the most unusual for them. Given the fact that the foreigners comprised only a fifth of the respondents and all of them came from other continents, the average score for rye bread was the highest. The respondents' dissatisfaction with the rye bread with fruits was mainly observed in the second day of degustation, as they considered it too dry or stale. The respondents from Indonesia mentioned that the rye bread was too sour, whereas the respondent from Brazil noted it was the tastiest and with the best texture. The others admitted: it was fresh and fruity, whereas some said that fruits and bread was not a tasty combination.

The German students who liked sweets considered the bread with fruits the best. For the others, this bread was too sweet, and some even said the fruits tasted too artificial. So, fruits may be best combined with sweet-and-sour bread rather than rye bread.

A remark mentioned most often by the Germans was that the sweet-and-sour bread was too sweet. They said that the bread did not necessarily need sweetness. On the whole, according to them, the rye bread and the sweet-and-sour bread were normal, but the bread with dried fruits was not typical.

The respondents were also asked to evaluate on a 5-point scale the most important factors in their choice of bread in everyday life.

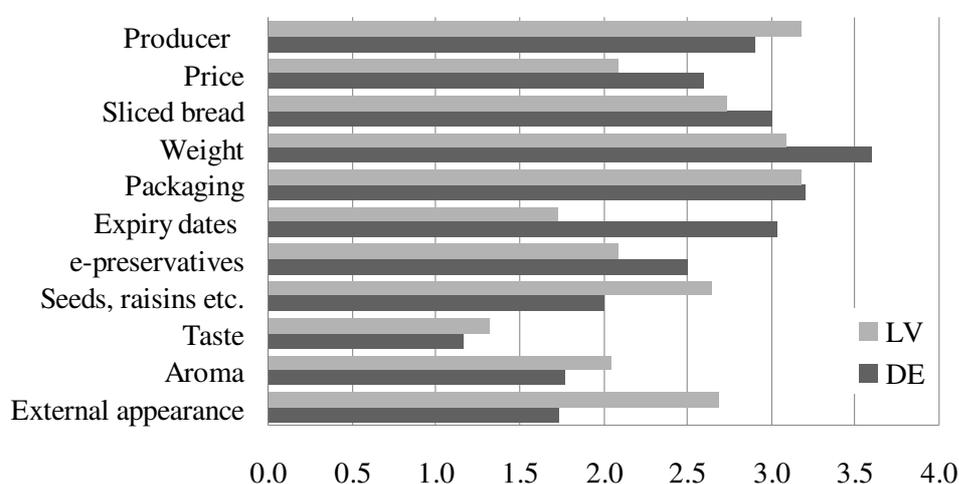


Fig. 2. **Importance of the criteria for the choice of bread to Latvian students and students in Germany ($n = 53$):** 1 – very important; 2 – important; 3 – neither important nor unimportant; 4 – little important; 5 – unimportant

The taste of bread was the most important criterion in the choice of bread among the students of both countries. Expiry dates in Latvia and external appearance in Germany were equally important, followed by the smell of bread in Germany. Seeds and grains added to bread were more important to the students in Germany than to the Latvians, whereas the fact whether dough enhancers and various preservatives were added to bread or not was the most important aspect for the Latvian students. Of course, the aroma of bread, which is most often hidden in the packaging, was also important to the Latvian respondents.

For the students in Germany, the most unimportant criteria were the weight of bread package and the packaging of bread, followed by expiry dates and sliced bread. In Latvia, the least important criteria were the packaging of bread, the producer and the weight of bread package.

The external appearance of bread was more important for the German students than for the Latvian students, as none among the German students said that the external appearance of bread was unimportant or little important. The Latvian students were indifferent to the external appearance of bread. In Latvia, the external appearance of bread was important to 45 % of the respondents, while a third of them did not pay attention to it. In Germany, the external appearance of bread was important to 93 % of the respondents. The smell of bread was important to two thirds of the respondents in Latvia and to 97 % in Germany. The taste of bread was equally important to all the youths, except a student from Vietnam who rated it as unimportant. The price of bread was an important criterion in the

choice of it to all the youths; for a third of the Latvian students, the bread price was very important, whereas for the German students it was fivefold less important. For almost a half of the German students, the bread price was a medium important criterion in their choice of bread.

The producer of bread was medium important for the Latvian youths, while for the German students it was more important. Approximately for 10 % more students in Germany than in Latvia the name of the producer was completely unimportant.

Conclusions

1. Young consumers in the bread market mainly focus on the taste of bread (quality), and they trust the producer.
2. For students in Latvia, the price of bread is more important than for students in Germany.
3. The German students rated the traditional rye bread the highest. The respondents from outside Europe gave the highest rating to the innovative solution – rye bread with fruits, which may be explained by the sense of sweet taste being typically characteristic of southerners.
4. Potentially, rye bread as a niche product could have a market in Europe where it is a relatively known product, whereas the innovative product – rye bread with dried fruits – could have a larger market outside Europe, closer to the geographic places where fruits are produced. There are new opportunities and ideas for globalising Latvia's original rye product. Safeguarding public health could be encouraged by popularising healthy rye bread among consumers, which is indirectly done by nutrition scientists around the world. Not only finished products but also raw materials, technologies or technical solutions can be sold. Assuring permanent quality cannot be achieved only by selling technologies, but engineering solutions are necessary to provide the right production and storage processes.

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