THE DIMENSIONALITY OF THE CONCEPT OF INTANGIBILITY : A CRITICAL ANALYSIS

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Key Words :

Intangibility, measurement scale, services offering

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THE DIMENSIONALITY OF THE CONCEPT OF INTANGIBILITY : A CRITICAL ANALYSIS AND EMPIRICAL STUDY

Abstract :

The main objective of this article is to develop a scale for measuring the degree of intangibility of a service offering after having first clarified the concept and analysed the various publications that have already appeared on this subject. A survey and a structural equation modelling analysis were conducted to examine the hypothesis of the bidimensionality (both physical and mental) of this concept. Recognising this double dimension of intangibility should be of interest to both managers of service activities and academics working on this area.

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INTRODUCTION

Among the characteristics which differentiate services from products, intangibility is recognized by a large number of specialists as the most important one (Zeithaml, Parasuraman and Berry, 1985 ; Flipo, 1988 ; Rushton and Carson, 1989 ; Rust, Zahorik and Keiningham, 1996 ; Zeithaml and Bitner, 2000 ; Bebko, 2000) and the only one which is common to all services, albeit at varying degrees (Flipo, 1988).

A central concept in marketing of services, intangibility has been an important subject for research. Many authors, for instance, have analysed the impact of intangibility on the ways services are managed (Shostack, 1977 ; Berry, 1980 ; Levitt, 1981 ; George and Berry, 1981 ; Zeithaml et al., 1985 ; Flipo, 1988 ; Rushton and Carson, 1989 ; McDougall and Snetsinger, 1990 ; Reddy, Buskirk and Kaicker, 1993 ; Edgett and Parkinson, 1993; Stafford, 1996 ; Mittal, 1999 ; Bebko, 2000 ; Grove, Carlson and Dorsch, 2002). These authors have been mainly interested in the consequences of intangibility, both for consumers and services providers, aiming at developing specific marketing strategies and improved management tools covering a large group of services. Strange as it may seem, there has however been little research on the concept of intangibility aiming at measuring the degree of intangibility of service offering.

And yet it is essential to fully understand what intangibility is - and understanding the degree of intangibility of a service offering is crucial if we are to apply appropriate and efficient marketing strategies. Our purpose in this article is triple. First of all, we shall clarify the concept of intangibility based upon literature in marketing and linguistics. We will then present results which have already been developed on applications of this concept and on existing scales of measurement. Finally, we shall propose and evaluate a new tool for measuring the degree of intangibility of a service offering or a brand ;

THE CONCEPT OF INTANGIBILITY

The intangibility of services is a central concept in marketing services, and yet there does not seem to be any consensus in literature on the definition which should be given to this concept.

Some authors define intangibility as being inaccessibility via the five senses before buying : "because it is intangible, a service cannot be seen, smelled, heard, touched, nor tasted before being bought" (Cowell, 1984 ; Kurtz and Clow, 1998 ; Kotler, 2000 ; Zeithaml and Bitner, 2000). Flipo (1984) extends this meaning to include sensorial inaccessibility even after the service has been bought.

Other authors prefer a more limited description. Shostack (1977) was one of the first to define the concept of intangibility by opposing it to tangibility. As such "tangible" means palpable and material. "Intangible" is an antonym and is thus impalpable and immaterial. In 1988, Flipo revisited the concept of intangibility and also restricted the meaning to touching, considering that the intangible would include the four other senses. By doing this, intangibility becomes a synonym for immateriality.

Bateson (1979) and Berry (1980) give a double meaning to intangibility : on the one hand the impossibility for something intangible to be touched and on the other hand the difficulty for it to be defined, formulated or understood mentally clearly and precisely. Rushton and Carson (1989) also quite clearly distinguish between what they call physical intangibility and mental intangibility. Mittal (1999) speaks of mental impalpability caused by the complexity or the degree of newness of the service.

We can see that the realities which cover this concept vary. Occasionally it is exclusively physically intangible with variations as to the possibility of being perceived sensorialy. At other times intangibility is both "physical" and "mental". And the debate continues. There are different opinions concerning the discreet or continuous characteristic of intangibility. A major courant in the literature (Shostack, 1977 ; Berry, 1980 ; Levitt, 1981 ; Rushton and Carson, 1989 ; Rust et al., 1996 ; Kurtz and Clow, 1998 ; Zeithaml and Bitner, 2000) states that all services can be evaluated according to their degree of intangibility. Other authors, such as Flipo (1988), say that if intangibility and service are to be defined exactly, they consider that saying a service is more or less intangible is mistaken, since a thing either is or is not physically intangible. They then conclude that a service is intangible (discreet vision of intangibility). Faced with these different opinions, it is important to clarify the discussion and present our position.

Intangibility and Intangible : A Question of Semantics ?

Defining the concept of intangibility means defining the concept of intangible. As the notion of "intangible" is abstract for consumers, and because it can vary slightly from one language to another it is important to refer on linguistic and its Latin origin. "Intangible" is one of the many words for which the original meaning has been reversed by common usage. Today, "intangible" is an antonym for "tangible" and is used to mean impalpable, inaccessible to touch. However, when we discussed this with a professor of Linguistics, he pointed out that the Latin word meant "that which must remain intact, sacred, inviolable. An intangible principle would then be that which cannot be changed, which remains constant, which is confirmed by French dictionaries. But surprisingly, common usage in French use "intangible" as a synonym of "immaterial", in a restrictive sense.

In current English, *intangible* has a somewhat different definition. The *Oxford Dictionary of Current English* (1996) defines it as 1) something that cannot be touched or seen 2) something that cannot be precisely defined and formulated, 3) something that is unable to be grasped mentally. The *Cambridge International Dictionary of English* says: "immaterial, impossible to be seen or touched, but real, and therefore difficult to be explained or shown".

As most literature on the marketing of services is written in English, the term "intangible" is used according to the English meaning but because of the restrictive common French usage, French-spoken authors (and maybe others) could feel uncomfortable.

So as to complete our understanding of the concept, we interviewed a number of French- and English spoken managers in the area of marketing of services. They came from the following sectors : banking, insurance, consultancy in strategy, in IT, law and quantitative modelisation. All of them, without exception, recognised intangibility as an important characteristic of their activity. They added that their service offering also included tangibles. All of them also identified, at varying degrees, the dual aspect, "physical" and "mental" of intangibility. Some managers even insisted on the importance of this in order to increase the comprehension of their offer.

After reviewing the literature and these interviews, we propose the following definition for "intangible" or "intangibility" as used in marketing, which is being supported by English definition, and therefore is wider than the restrictive common French usage of this concept:

1. A lack of material substance
2. An increased difficulty in defining, formulating or understanding clearly and precisely.

Intangibility and Continuum

Having defined the concept of intangibility, we must now analyse this in the context of another debate : is the intangibility of services discreet or continuous ? In other words, can we speak of a "degree " of intangibility or must we consider that a service is either tangible or intangible?

Our opinion comes from Shostack (1977) : what is commercialised is composed of discreet elements - tangible or intangible - but the whole can only be described as dominant, and can then vary according to the extent of intangibility. To put this differently : once we have specified that the object concerning the notion of intangibility is a global service offering, we can talk of continuum and thus of a degree of intangibility.

APPLICATION OF THIS CONCEPT IN THE LITERATURE

As we pointed out in our introduction, if the concept of intangibility has been widely examined in academic literature, little has been said as to its application. We have in fact found only two seminal studies which develop a tool for measuring the degree of intangibility of a service offering : McDougall and Snetsinger (1990), and, more recently, Laroche, Bergeron and Goutaland (2001).

McDougall and Snetsinger (1990) are the first authors to develop a tool for measuring the degree of intangibility of a service offering (see scale in Appendix 1). While this research is interesting in its approach and objectives, it is somewhat restricted. As the authors themselves say, it "focuses on the mental components of intangibility ". They applied the following definition of intangibility : "the extent to which a product can be visualised and gives a clear and concrete image before being bought". As such their scale of measurement can only partially comprehend the concept of intangibility, as it does not include the physical dimension.

On the basis of the criticism of the definition of intangibility by Berry (1980)[1] and of previous publications, among which are those of McDougall and Snetsinger (1990), Dubè-Rioux, Regan and Schmitt (1990) and Breivik, Troye, and Olsson (1998), Laroche et al. (2001) presented a new scale for the degree of intangibility of a service offering (see Appendix 2), which gives three dimensions to this concept.

The first dimension - inaccessibility to the senses – refers to the physical component of intangibility and was described by Breivik et al. (1998). Inaccessibility to the senses means that the attributes of a product or service are linked mentally rather than physically. By reference to Hirschman (1980), the authors describe the tangible attributes of a product/service as being perceivable sensorialy and as being physically associated to the product. It is possible to see, touch, smell, hear or taste them. Intangible attributes on the contrary only exist in the consumer's mind and are then linked mentally to the product/service. They require an individual mental construction and are thus dependent upon the individual who perceives them.

The second dimension, the generality dimension identified by Dube-Rioux et al. (1990) indicates that the consumer can perceive a service either generally or specifically. "Services are perceived as general if consumers cannot refer precisely to identifiable definitions, features and/or outcomes. Inversely, services are perceived as specific if they generate numerous clear-cut definitions, features and/or outcomes in the consumer's mind" (Laroche et al. 2001, p. 28).

Laroche et al. (2001) propose, further to the previous work, a third dimension for intangibility, which they call "mental intangibility". Preceding authors (Dubè-Rioux and al., 1990 and Breivik and al., 1998) did in fact only mention two dimensions : the abstract or concrete characteristic or inaccessibility to the senses (referring to the physical dimension of intangibility) and the "Generality " dimension covering the mental component. Laroche et al. (2001) add another dimension to the mental component. They started with the fact that "physical tangibility does not guarantee that the consumer have a clear mental representation of the object, especially when the evaluator has little experience of this object" (Finn, 1985 ; McDougall and Snetsinger, 1990 ; Laroche and al., 2001). This conception is new when compared to previous authors who seemed to imply that a product/service – when physically tangible – does not require a mental construction in order to be recognized, and thus the question of mental accessibility does not arise. Laroche and al. (2001) do propose that certain products which are physically tangible can be mentally intangible. Consequently, a microprocessor is sensorialy accessible (can be

seen or touched), but for many people, it is difficult to have a clear and precise mental image of its content, mechanism or the way it functions. The opposite is also true, certain physically intangible services can be mentally tangible. This is the case, for instance, of a trip using public transportation which is fairly easy to represent mentally.

A graphic representation of the three dimensions identified by Laroche and al. (2001) is given in Appendix 3, where each graph crosses two out of three dimensions according to the relevant products and services.

The research developed by Laroche and co-authors raises, in our opinion, several questions and remarks.

- First of all, conceptually, we would like to be assured that the "Generality" and "Mental Intangibility" dimensions are independent of each other. In fact we believe that both these dimensions are closely correlated. When we look at the definition of the mental component of intangibility as given by Bateson (1979) or Berry (1989) that we have chosen, it refers to the greater difficulty that something intangible has in being defined, formulated or understood clearly and precisely. The generality dimension as proposed by Laroche and co-authors shows the difficulty there is in defining or formulating it. The "Mental Intangibility" dimension refers to the difficulty in understanding, obtaining a clear mental representation of a service. But is not the capacity to define or formulate directly influenced by the degree of understanding of a service ? Moreover, when we examine the graph in Appendix 3 where Laroche and al.'s mental intangibility crosses generality, we can see that the four examples are situated approximately on a diagonal. And we were not able to find any examples of services for each quadrant.
- Secondly, as to application, all the items as given by Laroche et al. (2001) do not seem appropriate. The ones chosen for applying the Generality dimension do not seem to correspond to its definition (see Appendix 2 for the list of items). The general or specific character of a service does not seem to us to be an indicator of its capacity for defining a service, its characteristics or results. As Johnson and Fornell (1987) state, it would rather indicate the level of detail of an offer. According to these authors, specific attributes would be linked to the brand and general attributes to the category of service. As to the abstract or concrete character of a service, we question its definitive and unshakeable belonging to the mental category of intangibility. Could it not also be a physical component of intangibility for consumers ? Some cases also seem to be inadequate for certain categories of services or for other levels of brand analysis. For instance, the item : "I can physically grasp the *product/service*" when we are talking about any bank or Citibank in

particular[2] In other cases, some items are not sufficiently precise : the "This *product/service* is 1 = very general to 9 = very specific" could be interpreted in many different ways.

- Finally, certain results observed by Laroche et al. (2001) concerning the reliability and convergence validity proper to the generality dimension can be a problem. Cronbach's alpha for this dimension has a value of 0.61, which is the extreme value when compared with customary recommendations in this area (Nunally, 1978 ; DeVellis, 1991). And the average extracted variance is 0.47 for the convergence validity for Generality is inferior to Fornell and Larcker's recommendations (1981).

While not rejecting the scale proposed by Laroche and al., we plan to develop a new measuring instrument which is applicable both for categories of services and for brands. We also question the tri dimensionality of the concept of intangibility and propose the following hypothesis:

H1 : *The concept of intangibility is composed of two dimensions ; one concerns the physical components of intangibility and the other its mental components.*

METHODOLOGY

From Churchill (1979) to Rossiter (2002), the construction of a scale of measure on the basis of the definition of a construct has in itself been at the source of research and publications showing the difficulty of such an exercise. To build a trustworthy and valid scale of measure, we used the traditional general framework proposed by Churchill (1979), while respecting remarks and later developments for this procedure and using present day statistical tools (Cohen and Cohen, Teresi, Marchi and Velez, 1990 ; Bagozzi, 1994 ; Rossiter, 2002). According to the specifications of our area of constructs, the first phases are :

- generation of items in order to write up the questionnaire;
- administration of the scale in a primary survey;
- purification of the scale on the basis of these results;
- administration of the purified scale for the second survey;
- analysis of results of the purified scale;
- confirmatory factor analysis using structural equation modelling;
- reliability and validity measures of the scale;
- superiority of the bidimensional model.

Generating items

A first list of items was made on the basis of previous work mentioned above. As well as an in-depth analysis of each item in these papers, we held semi-directive interviews of managers and personnel in different companies (computer science, tourism, banks, insurance, engineering) and among their potential customers. We ended up with a total of 17 items (in French), 5 items supposed to measure the physical component of intangibility, 12 items for the mental component. This list, in Appendix 4, was pre-tested on consumers and on professional and academic experts in France and in Belgium.

Administration of the scale in primary survey

We gave the questionnaire with the 17 items to 692 persons. The convenience sample is composed of French and Belgian students, of both sexes, from different areas of study (law, economics, sociology, political science, business, engineering), both undergraduate and graduate and belonging to different age groups.

As for Laroche and al. (2001), this research covered both products and services traditionally associated with intangibility. Two products and four services were chosen regarding the expectation of different degrees of physical and mental intangibility. These products and services are jeans, laptop, saving account, Rome-London flight, a visit to the doctor’s and insurance for trip cancellation.

Each self-administered questionnaire included one product and two services. Each item was measured on a differential semantic scale with 7 points. Four versions of this questionnaire were distributed, with a change in the presentation of products and services. 643 of the 692 questionnaires were completed ; 16 were incomplete and not accepted. Thus a total of 627 questionnaires were registered and we obtained 1881 applications of the scale of the measure of intangibility.

Purification of the scale

As usual, we did a factor analysis of collected data's, on the products and services as a whole and then for each of them studied individually.

The results of the factor analysis (Table 1) with varimax rotation for all data, confirmed the existence of two factors (eigenvalues superior to 1). The first factor concerning the mental dimension of our proposition contributed 37,0% of the explained variance, the second factor on the physical dimension contributed 27,1%, with a total of 64,1% for the total variance for both factors.

Table 1 : Results of the factor analysis

	FACTOR	
	1	2
M2	,810	
M3	,738	
M4	,683	
M6	,825	
M8	,588	
M9	,692	
M10	,613	
M12	,831	
M13	,716	
M14	,763	
M15	,498	
M16	,724	
P1		,731
P5		,877
P7		,898
P11		,790
P17		,759
Proper value	6,29	4,61
Explained Variance	37,0%	27,1%
Cronbach Alpha	0,93	0,89

If we force three factors in our factor analysis as suggested by results of Laroche et al. (2001), we realise that this third factor is not pertinent, because the eigenvalue of this factor is equal to 0.785, which is much lower than what Kaiser (1960) prescribes.

The reduction of variables for the scale of intangibility was based on correlation's of structure or loadings and on the interpretation of variables. We discarded items whose loadings compared to other items, were the weakest for the factors studied or insufficiently weak for the other factor. Beyond this, we decided to eliminate items thought to be redundant (synonymous). We then had 7 items (Table 2) : 4 for the mental dimension and 3 for the physical dimension of intangibility.

Table 2 : Adjustment of the scale

Dimension	Items	Cronbach Alpha	Discarded Items	New Alpha (a)	Explained Variance
Mental	M2, M3, M4, M6, M8, M9, M10, M12, M13, M14, M15, M16	0.93	M3, M4, M8, M9, M10, M12 M15, M16	0.83	48.4%
Physical	P1, P5, P7, P11, P17	0.89	P11, P17	0.86	24.0%

Factor analysis with varimax rotation for the 7 retained items, applied to two products and four services considered separately, confirm the proposed bidimensional structure. We can see that if we again force three factors in factor analysis, we can observe that this factor remains non pertinent, since its eigenvalue is equal to 0.55.

The Second Survey

Based on the first results, a second survey of 269 (other) students with approximately the same characteristics as the first group was made. They received a questionnaire with the 7 items for the scale of measure covering 3 identical products and services per survey. Two versions of the questionnaire were administered and 256 questionnaires were registered and analysed.

As to chosen products and services, one product and one service identical to the first survey were kept : jeans and the saving account. Dinner in a pizzeria was the new service introduced as a partial external validity. This choice was based on Shostack (1977)'s unidimensional continuum presenting the expected degree of intangibility (with a physical meaning) for products and services. Such a service is usually considered half way on the continuum of intangibility. Consequently the second survey was based on a product thought of as having a strong tangible dominant (jeans), a service considered as somewhat tangible (dinner in a pizzeria) and a very intangible service (saving account) on this scale.

Analysis of Results

Before analysing structural equations modelling, another factor analysis was done with varimax rotation on the data. The results based on this second survey are presented in the next Table. Two factors are again retained

(eigenvalues superior to 1) explaining 75% of total variance. The variances which are explained are respectively 52% for factor 1 for the mental dimension and 23% for factor 2 for the physical dimension. Reliability analysis (Cronbach Alpha) gave highly acceptable coefficients of 0.83 and 0.90 respectively for the two factors (Nunally, 1978 ; De Vellis, 1991).

Table 3 : Factor Analysis - Purified scale

	Factor	
	Mental	Physical
M2	.860	
M6	.806	
M13	.771	
M14	.812	
P1		.871
P5		.894
P7		.911
Eigenvalue	3.64	1.61
Explained Variance	52.0%	23.0%
Cronbach Alpha	0.83	0.90
? de Jöreskog	0.90	0.93

Confirmatory factor analysis

To assess the validity of the factor structure, we used a confirmatory factor analysis with the hypothetical model which was a result of the purified scale and shown in the next figure. The Lisrel 8.30 software (Jöreskog and Sörbom, 1993) was used for this. The correlation matrix of indicators was the database for input and the procedure for estimation was the maximum likelihood method. Note that the size of the final sample for the second survey is 256 respondents answering the three applications of the scale, i.e. 768 observations with 704 questionnaires filled out completely. The normality of data was tested by an analysis according to the values of Skewness and Kurtosis (Kline, 1998).

Figure 1 : Hypothetical Model

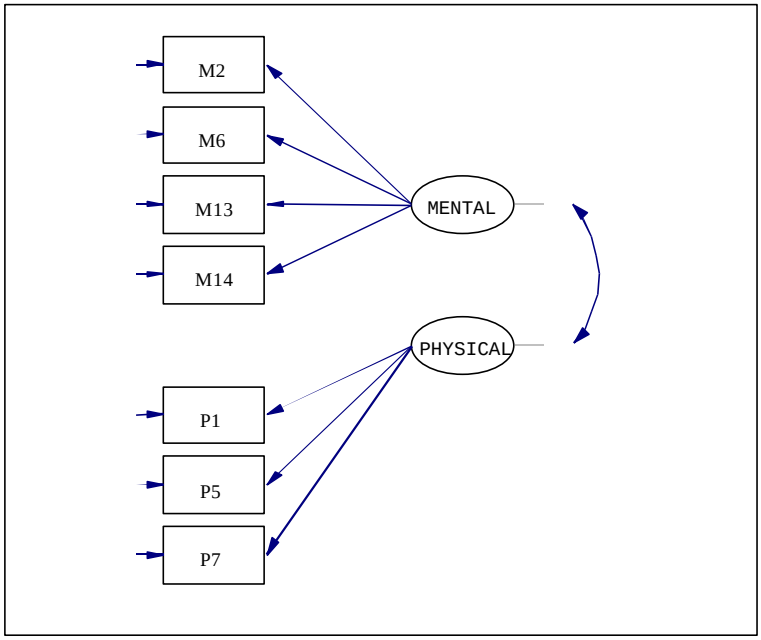


Table 4 presents the factor loadings for indicators related to both dimensions of intangibility, with the threshold of significance for t of Student associated with each indicator. These loadings are between 0.78 and 0.95, at a level of significance inferior to 0.05 for all indicators. This verification or the absence of abnormal results or of insignificant parameters is a first step in evaluating the quality of the model (Bagozzi and Yi, 1988). Analysis of R^2 gives an evaluation of the percentage of explained variance for each indicator, varying from 0.61 to 0.90 in function of the indicator.

Table 4 : Coefficients for the Measurement Model

Latent Variables	Indicators	Factor Loadings	Degree of significance for t of Student	R^2
Mental Dimension	M2	0.78	0.036	0.61
	M6	0.81	0.035	0.65
	M13	0.89	0.035	0.80
	M14	0.86	0.037	0.74
Physical Dimension	P1	0.83	0.031	0.68
	P5	0.93	0.029	0.87
	P7	0.95	0.029	0.90

To continue our evaluation of the quality of adjustment of the model, we examined a series of indices for adjustment, supplied by the software which should attain certain threshold values (Bagozzi and Yi, 1988). We used three categories : 'absolute fit' measures, 'incremental fit' measures and 'parsimonious fit' measures [3]. The choice of the measures presented in Table 5 from the whole available group, is based on recommendations by Roussel, Durrieu, Campoy, and El Akremi (2002), which summarize the work of several researchers. We can

further say that the size of the statistic sample of our model is 704 as each respondent had to use the scale three times (for one product and two services).

Table 5 : Adjustment Indices for the Model

Absolute Indices	Value	Incremental Indices	Value	Parsimony Indices	Value
GFI	0.99 > 0.9	NFI	0.99 > 0.9	?² normalised	3.18
AGFI	0.96 > 0.9	IFI	0.99 > 0.9	ECVI	0.096
Critical N	524.47 > 200	CFI	0.99 > 0.9	PNFI	0.47
RMR	0.020			PGFI	0.35
RMSEA	0.056 < 0.08				

This Table shows a highly acceptable quality of adjustment even if the key values of indices should be considered as relative rather than absolute (Roussel et al., 2002).

Reliability and Validity Measures

We have seen the satisfactory results for the reliability analysis with the Cronbach Alphas for each factor (0.83 and 0.90). An alternative or complementary information for this indice is the ? of Jöreskog with its lower sensitivity to the number of items (Roussel et al., 2002). We observe the values 0.90 for the mental dimension and 0.93 for the physical one, with values superior to the thresholds of 0.7 to 0.8 which are usually accepted (Fornell and Larcker, 1981).

We can then look at the validity of construction of latent variables by analysis of convergent validity and discriminant validity, proper to the constructs of our scale of measure.

The convergent validity is verified by the following conditions (Roussel et al., 2002; p. 56) :

1) The test t associated with each factor loading is significant, that is superior to 1.96. This is verified for each of our 7 indicators (see Table 4 with the level of signification of t of Student < 0.05).
2) Each indicator must share more variance with its construct than with the margin for error which is associated with it. This is also true for all the 7 indicators (see Table 4 : the square of all factor loadings for indicators is > 0.5).
3) We can associate the criteria of average extracted variance or the rhô of convergent validity in Fornell and Larcker (1981). The convergent validity is established if the value for each factor is at least 0.50 of the total

variance. This condition is verified for both factors, as shown in the next Table which summarises the 3 conditions for convergent validity.

Table 6 : Evaluation of Convergent Validity

Dimension	Nbr of ? non significant to 0.05	Nbr de R^2 associated inferior to 0.5	? (vc)
Mental	0	0	0.700
Physical	0	0	0.818

Discriminant validity is also assessed by comparing the average extracted variance of each latent variable with the squared correlation shared with other latent variables (Fornell and Larcker, 1981). This must be lower than the values corresponding to extracted variances. The square of the correlation between the two latent variables -equal to 0.26-, is well under the two corresponding extracted average variances in the Table below (? (vc)).

Superiority of the bidimensional model

Our re-examination of the tri-dimensional model proposed by Laroche et al. (2001) is founded partially on convergent validity but also on reliability (cfr. below). Doubt about the existence of a third factor has been confirmed as justified through our exploratory factor analysis. We must now test the superiority of the bidimensional model of intangibility over an unidimensional model.

Following the technique proposed by Han, Kim, and Srivastava (1998), we compare the results of the confirmatory analyses considering both cases. The observed results for unidimensional model lead to the rejection of this structure, due to convergent validity problem. All the conditions of this convergent validity are no longer respected with low factor loadings for indicators linked to the theoretical physical dimension (factor loadings <0.5 or <0.6 with a R^2<0.35). The comparison of adjustment indices related to the confirmatory factor analysis results for a structure with just one factor (intangibility) versus a two factor structure (mental and physical). is completely favourable to the bidimensional model (See Appendix 5).

Moreover, the bidimensional structure has been tested for each product and service individually. Each time, the results of the factor analysis confirm the bidimensionality of our concept.

All of this allows us to believe that the bidimensional model is the most appropriate one for representing the concept of intangibility.

DISCUSSION

The results observed confirm the proposed bidimensional factor structure for the concept of intangibility:

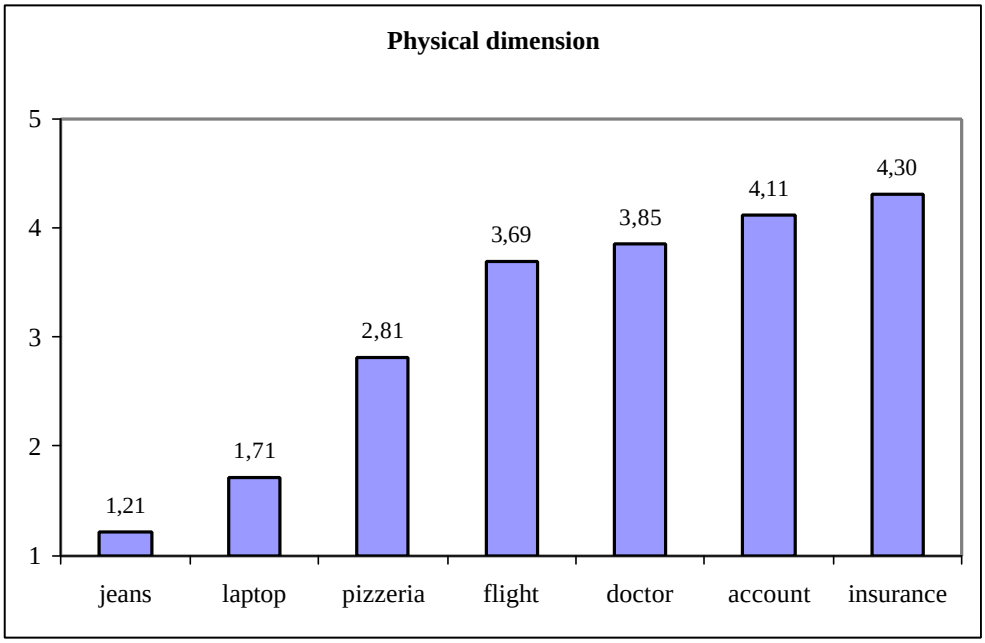
- a physical dimension for the degree of materiality of the concerned product or service;
- a mental dimension linked to the specific difficulty for a product or service to be considered as being defined, formulated or understood clearly and precisely.

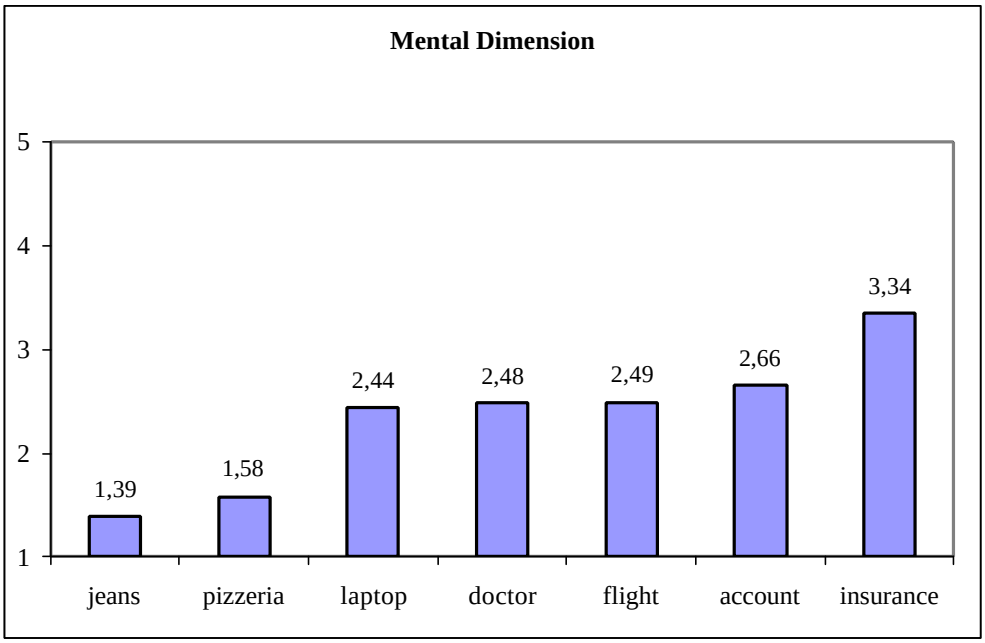
The dimensionality of intangibility has been at the heart of dense conceptual discussions for a certain time. Bidimensionality, as suggested by Bateson (1979) or Berry (1980), has had its proponents and detractors. The scale given by Laroche et al. (2001) stipulating that there is a third dimension, had the merit of advancing the most developed measure for the concept. However, certain inferior levels of reliability and validity for the tool, as well as the opinion of experts on the content validity of the generality dimension of their scale, have confirmed that we were correct in questioning the value of this instrument.

Application of the scale to various categories of services and products.

In order to test the bidimensional structure of the concept, we used this new measurement scale, which we applied to 7 categories of different products or services : laptop, jeans, saving account, insurance for trip cancellation, a visit to the doctor's, dinner in a pizzeria and a Rome-London flight. The following figure shows these products and services over two continuums of intangibility, where we can distinguish both of the identified dimensions.

Figure 2 : The Continuums of Intangibility for Both of the Identified Dimensions





Note : Score calculated on the basis of an evaluation for a scale of 7 points, from 1 (= very tangible) to 7 (= very intangible)

See Appendix 6 for an explanation of the calculation of scores for product/service

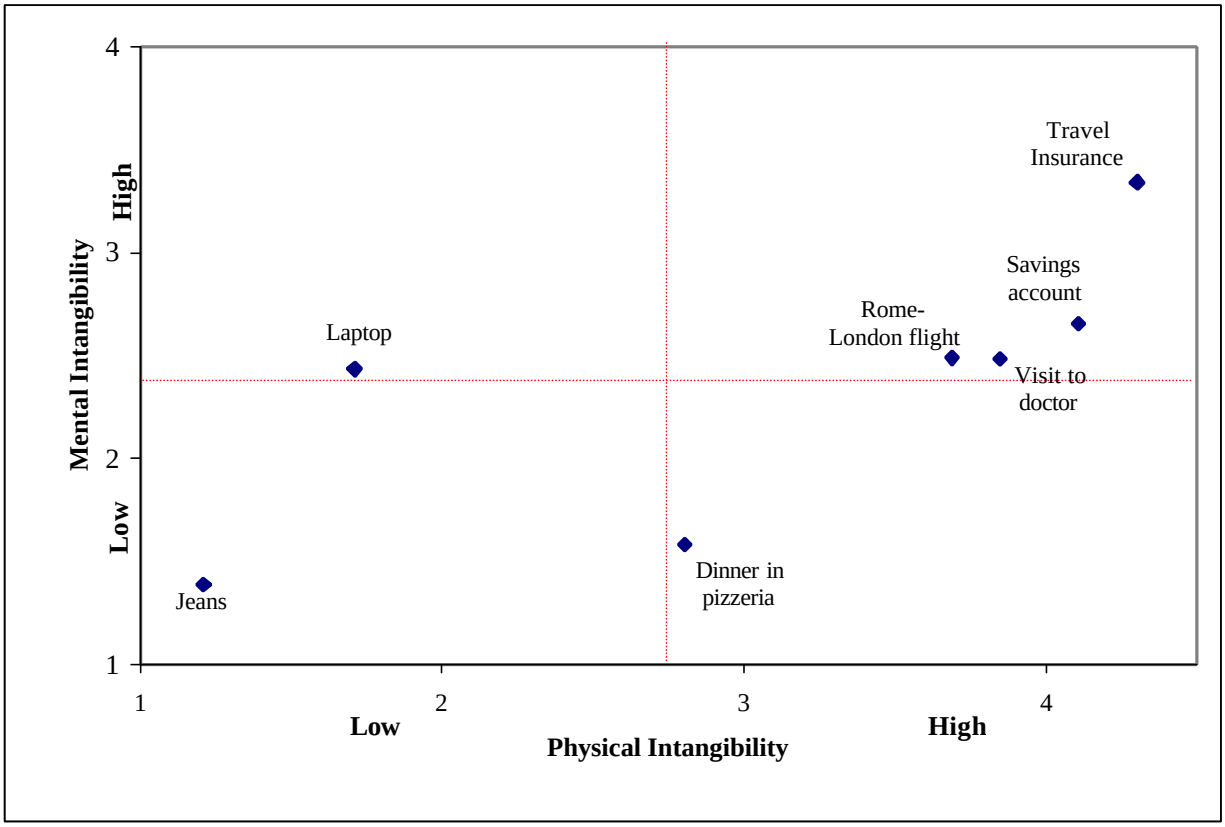
The first continuum (on the physical dimension) agrees with the Shostack proposition (1977) and presents products and services from the most tangible to the most physically intangible.

The second continuum (mental dimension) ranks products and services from the most tangible to the least mentally tangible. This means we can underline certain differences by comparison with the first continuum. The score of physical intangibility for the dinner in a pizzeria is thus higher than that of a laptop. However, the laptop presents a score of mental intangibility superior to that of a dinner in a pizzeria, and close to the score observed for visit to the doctor's. Dinner in a pizzeria is close to the score for jeans in its mental dimension. So we can see that the physical dimension of intangibility allows us to distinguish products from services, which is not always true of the mental dimension. Regarding those results, the order on the continuum could be modified between the categories of services according to whether one places them on the physical continuum or the mental continuum of intangibility.

In our study, we have also seen that the score of mental intangibility for a service is always inferior to its physical score while the opposite is true for products. Could not this distinction between products and services in our study be extended to all products and services?

Represented on a single graph with the 2 dimensions of intangibility, products and services are spread over 4 possible situations according to the high or low degree of each dimension.

Figure 3 : Positioning of 7 products and services in a two dimension graph



Jeans are in the quadrant where intangibility is weak for both dimensions. The laptop is positioned as physically tangible but mentally intangible. On the contrary, dinner in a pizzeria is in the quadrant "physically intangible, mentally tangible". Finally, the other services are situated in the quadrant where intangibility is strong for both dimensions.

These results do not allow us to confirm that materiality implies good understanding of a product or service, but only that it may help attain a cognitive representation. We can easily have a cognitive understanding of a laptop, without being able to understand, define or formulate what it is. This is a more precise vision of what Ward (1996) said concerning the cognitive concept of intangibility.

MANAGERIAL IMPLICATIONS, LIMITS AND RESEARCH OPPORTUNITIES

In a managerial approach, recognising this double dimension of intangibility could be of interest to many managers of products and services. What are the levels of physical and mental intangibility of their product or service? In fact intangibility cannot be reduced to immateriality. It is thus essential that a manager know the degree of intangibility for his or her category of product or service where both dimensions are present. Whatever is commercialised in the mind of the service provider or manufacturer of goods should correspond to what the consumer expects to acquire. Are sales arguments or other forms of communication (as studied for instance by Stafford, 1996 ; Mittal, 1999 ; Grove, Carlson and Dorsch, 2002) adjusted to the degree of intangibility of the product or service ?

And, again, so as to increase understanding of its competitive position, it would be wise for the manager to position the brand according to the double intangibility, comparing it with its category as well as with competitive brands. It would be useful to decide whether or not to reduce the perception consumers have of intangibility for one or more of the dimensions. If necessary, techniques of purely physical tangibilisation – currently the most used (such as in Shostack, 1977 ; Berry, 1980 ; Levitt, 1981 ; George and Berry, 1981) – could be differentiated from techniques of mental tangibilisation. Should the perception of the physical dimension be largely identical for consumers of the brand, the mental dimension could vary with the category of consumer. Consequently, managers could choose a segmented approach both as a strategy and operationally. Finally, a manager could evaluate the incidence of double intangibility on consumer attitudes and behaviour, segment by segment. And , another example, on his or her perception of the risk involved .

However, this research does have some limits which are opportunities for future research :

- First of all, the choice of the two samples from a population of students, while customary and convenient is limited as to representativity. The same study could be made with a sample of actual or potential consumers, for the chosen products and services. Let us add however that the products and services were chosen in function of our respondents as truly potential consumers.
- Secondly, the choice of products and services for our research was both heterogamous on the continuum of physical and mental intangibility and adjusted to the population we sampled. The number and variety of products and services examined could be increased and the results compared with the ones from our study.

- Thirdly, Laroche et al. (2001) point out that the degree of expertise of consumers on these products and services is supposed to influence their perceptions of intangibility. This characteristic of consumers should be integrated in a research planning to better know the relationship on both dimensions of the intangibility.
- And finally, the role for each dimension referring to consumer behaviour, in the widest possible meaning, opens new perspectives for research. The question of the role of the brand on the process of tangibilisation of the product or service also arises and will be pursued as a further step in our research.

The principle result of our research is to propose a measurement instrument of intangibility in accordance with the definition close to that of Bateson (1979) and Berry (1980), applicable to both the products and the services we examined. So it is that the continuum of physical intangibility, proposed by Shostack in 1977 has been illustrated on an empirical base. The mental dimension of intangibility is also given with its continuum and adds appreciably to our understanding of this concept.

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APPENDIXES

APPENDIX 1 : MEASUREMENT SCALE - MCDOUGALL ET SNETSINGER (1990)

1. I have a very clear picture of this *item*
2. The image comes to my mind right away
3. This is not the sort of *item* that is easy to picture
4. This *item* is very tangible
5. This is a difficult *item* to think about

APPENDIX 2 : MEASUREMENT SCALE - LAROCHE, BERGERON ET GOUTALAND (2001)

Dimension of "inaccessibility to sense" :

P1 : This *item* is very easy to see and touch

P2 : I can physically grasp this *item*

P3 : This *item* is very tangible

Generality dimension :

G1 : I feel that this *item* is *1 = very abstract* to *9 = very concrete*

G2 : I feel that this *item* is *1 = very general* to 9 = very specific

Mental intangibility Dimension :

M1 : I need more information about this *item* to make myself a clear idea of what it is

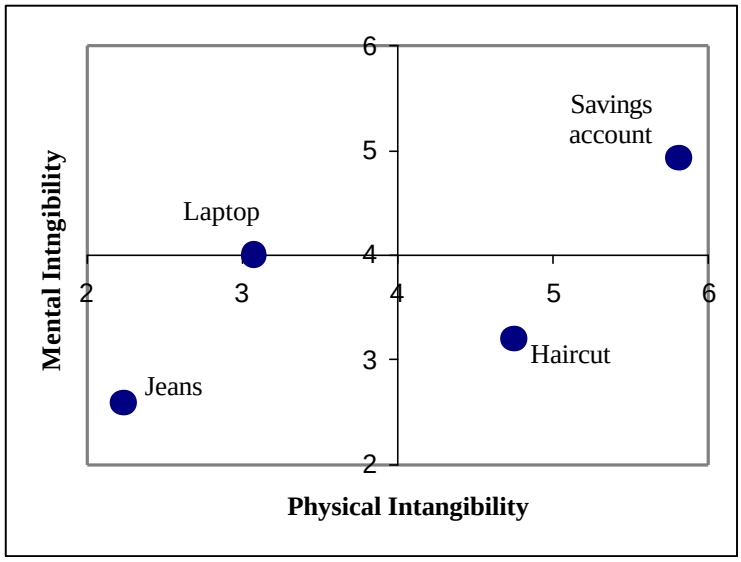
M2 : I have a clear picture of this *item*

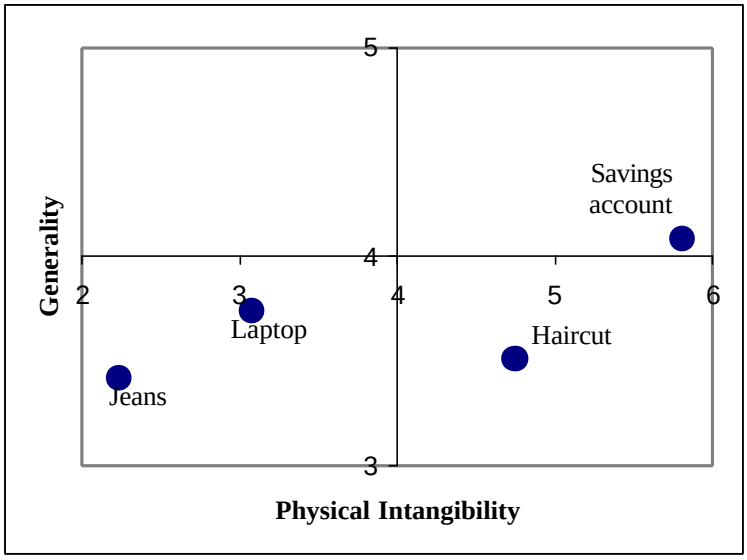
M3 : The image of this *item* comes to my mind right away

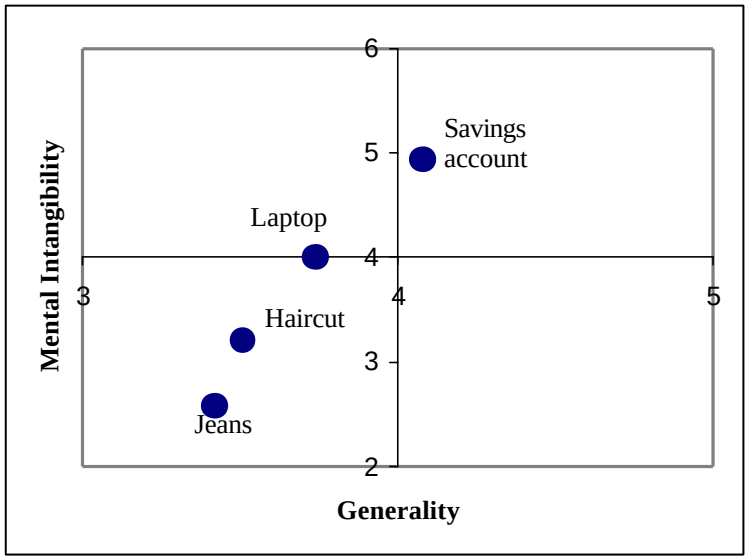
M4 : This is not the sort of *item* that is easy to picture

M5 : This is a difficult *item* to think about

APPENDIX 3 : GRAPHIC REPRESENTATION OF 3 DIMENSIONS OF INTANGIBILITY PROPOSED BY LAROCHE, BERGERON AND GOUTALAND (2001)







APPENDIX 4 : LIST OF GENERATED ITEMS [1]

P1 : I consider the item to be *1 = exclusively material* to *7 = exclusively immaterial*

M2 : I am able to explain to a friend what the item is *1 = very easily* to *7 = with great difficulty*

M3 : The item makes me think of something *1 = very precise* to *7 very vague*

M4 : I am able to bring to mind what an item is *1 = very easily* to *7 = very difficulty*

P5 : An item makes me think of something *1 = which is very easy to see and to touch* to *7 = which is very difficult to see and to touch*

M6 : I understand what the item is *1 = very easily* to *7 = very difficulty*

P7 : The item makes me think of something *1 = completely palpable* to *7 = completely impalpable*

M8 : The term "item" makes me think of something *1 = completely defined in my mind* to *7 = not at all defined in my mind*

M9 : In order to clearly understand what an item is *1 =I need more explanations on what it is* to *7 =I don't need any more explanations on what it is*

M10 : When I hear the term "item " I immediately have in my mind a picture *1 = that is very precise 7 = that is very vague*

P11 : An item makes me think of something *1 = which is very easy to see* to *7 = which is very difficult to see*

M12 : I am able to explain to a friend what the item is *1 = very precisely* to *7 = very vaguely*

M13 : Item makes me think of something *1 = very simple* to *7 = very complicated*

M14 : I am able to define what the item is *1 = very precisely* to *7 = very vaguely*

M15 : An item makes me think of something *1 = very concrete* to *7 = very abstract*

M16 : The term "item " makes me think of something *1 = very clear* to *7 = very vague*

P17 : An item makes me think of something *1 which is very easy to touch* to *7 which is very difficult to touch*

The word "Item" is replaced by the corresponding service or product.

[1] Note that this scale has been originally developed and tested in French.

APPENDIX 5 : COMPARISON OF ADJUSTMENT INDICES TO UNIDIMENSIONAL AND BIDIMENSIONAL MODELS

Absolute Indices	Value		Incremental indices	Value		Parsimony indices	Value	
	1 fact.	2 fact.		1 fact.	2 fact.		1 fact.	2 fact.
GFI	0.80	0.99	NFI	0.80	0.99	?² normal.	54.97	3.18
AGFI	0.50	0.96	IFI	0.81	0.99	ECVI	0.91	0.096
Critical N	23.88	524.47	CFI	0.81	0.99	PNFI	0.42	0.47
RMR	0.19	0.020				PGFI	0.32	0.35
RMSEA	0.28	0.056						

APPENDIX 6 : QUANTITATIVE DATA FROM GRAPHS

Calculated scores :

Scores per dimension have been calculated with a weighted average from the averaged factors for each indicator. This allowed us to respect the mathematical representation of different factors (Field, 2002). The results obtained were :

	Physical	**Mental**
Jeans	1.210	1.389
Laptop	1.710	2.435
Dinner in a pizzeria	2.806	1.583
Rome – London flight	3.691	2.488
Visit to the doctor's	3.848	2.484
Savings account	4.109	2.655
Insurance for trip cancellation	4.302	3.343

Position of axis's :

Extremes were taken into account in calculating averages for jeans and insurance. Jeans were seen as very tangible for 2 dimensions, while insurance was intangible for both. Considering the average for all 7 products et services would have lead to false the result as we had 2 products for 5 services.

➔ $\text{Average}_{\text{physical}} = 2.75$ and $\text{Average}_{\text{mental}} = 2.37$

NOTES

[1] "The concept of intangibility has two meanings : 1. That which cannot be touched, impalpable ; 2. That cannot be easily defined, formulated or grasped mentally" (Berry, 1980, p30).

[2] "I can physically grasp Citibank"

[3] The definitions of these adjustment indices of are:

- "an indice of absolute adjustment allows us to evaluate the extent to which the theoretical predetermined model correctly reproduces collected data " (Roussel and alii, 2002, p. 62)
- "An incremental indice measures the improvement resulting from an adjustment by comparing the tested model to a more restricted one called the base model » (Roussel and alii, 2002, p 65)
- "The use of parsimony indices is justified by three reasons (Roussel et alii, 2002, p68) :
  - To avoid over-estimating a given model (artificially improving the degree of adjustment of the model through an exaggerated number of parameters used for estimation).
  - To check that a poor degree of adjustment doesn't appear as opposed to an underestimation of the tested model (obvious absence of parameters to estimate because too few parameters were established)
  - To allow the choice of the model, from several possible models, which has the best degree of parsimony, and as such should be chosen. »