Variables tangibles e intangibles sobre productos y servicios: la creación de fitness application ‘punnett square’ (faps)

Product or service tangible and intangible variables: the creation of the fitness application ‘punnett square’ (faps)

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Abstract: Health and fitness (H&F) industry has always highlighted product’s tangible variables over intangible ones. Nowadays conspicuous market models are proving that these facets are increasingly required by international societies and contexts and are demonstrated to be incredibly useful. The applicability and usability of fitness resources (products, services or mixed solutions) depends upon a genuinely innovative approach on the definition of those hidden intangible variables. This literature analysis underline that also academic contributions focus more attention on ‘touchable’ variables, but it’s now the time for the ‘B side’. The introduced Fitness Applications ‘Punnett Square’ (FAPS) tool helps to better understand the ever-growing world of fitness industry resources. It is also direct applicable to all those sector professionals who operate in their daily-life facility routine, with the final goal to increase levels of assessment of H&F product and service knowledge, for what already own and for emergent choices or purchasing actions.

Keywords: Fitness industry, health service, intangible variables, Fitness Applications ‘Punnett Square’, fitness equipment, market models

Resumen: La industria fitness y salud (H&F) siempre marcó más las variables tangibles de los productos antes de las intangibles. Hoy en día, en los modelos de negocios que funcionan, se ha demostrado como estas resultan increíblemente útiles. La aplicabilidad y usabilidad de recursos fitness (productos, servicios o soluciones mixtas) se plantean sobre el innovador enfoque que define estas calidades más escondidas. Esta revisión de la literatura académica tiene el reto de evidenciar este ‘lado B’. La introducción de la herramienta nombrada Fitness Applications ‘Punnett Square’ (FAPS) ayudará a entender de forma mejor los recursos del sector fitness que siguen en constante desarrollo. También, resultará aplicable a todos los profesionales del sector que utilizan equipos (físicos o menos) en su día a día en instalaciones deportivas. Bien para todo lo que ya está en posesión para aumentar los niveles de valoración, tanto como para todas las elecciones frente a acciones futuras.

Palabras clave: Equipamiento fitness, Fitness Applications ‘Punnett Square’, industria del fitness, modelos de negocio, servicios de salud, variables intangibles.

Introduction

The health and fitness (H&F) industry, nowadays, in a maturation phase (Fallon, 2004) after almost two decades of continuous fresh contributions due to the arrival of new sectoral technologies. Interaction design has directed the H&F industry, intentionally or unintentionally, toward technology-mediated ways of movements and workouts (Parviainen, 2011a).

This maturation is visible in every kind of product or service available. Certainly, this new stage does not precisely represent a slowdown of the innovation processes, but rather a consolidation of the latest developments, mainly provided by private international manufacturing companies and their performances (Takaki, 2005).

A fitness brand is composed of a range of knowledge and ‘active’ amenities (changes, improvements, update) which are the main means of distinction and buyer’s loyalty (Kennedy-Armbruster et al., 2011). The mode of transmission within global markets can be either horizontal or vertical, and actively touch three different conceptual spheres: social, cultural, and geographical (Parviainen, 2011a). At the same time, with improvements in living standards, human beings are living longer and life span bring convenient facilities worldwide and not only in ‘western’ environments (Yoon & Ahn, 2015; Algar, 2017).

Lately, several recognized field ‘gurus’ confirm that the new recommended ‘pill’ is physical activity (PA). The question is, with which methods should the population approach exercise, and what composition tools do we have in our hands?

Tangible qualities (‘touchpoints’) are more common. These, can include fitness equipments, technical devices or flooring (lately this has even included walls, for spaces optimization). Intangible qualities concerns the ways in which single workouts are ‘chained’ together (Parviainen, 2011b). In this second case, key points are more hidden, with experienced and designed choreographies with sought ‘cornerstones’ such as managerial rhetoric and the nature of standardization (imi-
In gyms, leisure centers, personal training studios, corporate realities, home and hospitality sectors one is likely to encounter the same offering, unless approaching the latest ‘boutique’ models (Strand et al., 2010; Bennie et al., 2016). Among ‘physical’ products (also defined as ‘material-themed’) the main equipment categories are: cardio-respiratory, resistance-strength, and ‘subsiding’ (such as free weights, kettlebells, dumbbells, resistance bands, fit balls, etc.). These apparatuses barely embrace human coordinative capacities (balance, proprioception, exteroception, etc.), but rather targeted conditioning ones. The services (‘non-material’) include more recently introduced training concepts (mainly without classic overloads, but still with an orientation towards cardio and strength abilities), fitness group classes of various derivations (ballet and rhythm, new age disciplines, regulated struggle and its derivatives, relaxation, etc.), and so on.

Today it is difficult to make a clear distinction between fitness goods and services (qualities) because classes and programs are sold with or without some material support (resources) and vice versa (Parvianen, 2011b).

The ultimate goal of this study is to highlight the gap in the knowledge about fitness equipment and what has emerged in published articles in relation to its field ‘resources’, simultaneously to all which is defined in literature as product ‘variables’, because little is known about the information available in scientific databases. Against this backdrop, this paper provides a traditional literature analysis on all products’ facets: from every material and touchable areas of investigation, until all those intangible variables that currently define and represent this industry’s final results. In this context, it has been debated whether sports scientists need to enter this fitness industry sub-sector more proactively.

Methods

Traditional literature analysis is defined as a method involving a comprehensive search for relevant knowledge and articles on a specific investigation argument, and those identified and selected are then appraised and summarized (De Lyon et al., 2017). The final aim is to analyse a large body of literature, in order to understand the current state of the art, in this case regarding - fitness equipment - with other specific independent variables, in relation to all those defined resources and quality variables (material-themed or not) connected to these sectoral products.

For this review, the search was not limited to sports-related journals but included articles located in the areas of communication, design, engineering, IT, management, marketing, material sciences, mechanic, medicine and surgery, and robotics / aerospace.

The analysis started in September 2017, and the latest search was performed on 28th February 2018. Data collection was performed by one independent investigator experienced in international management and marketing of products in the H&F field.

Data sources and searches

Starting with four main databases (Medline, ISI-WoS, Scopus, and Sport Discus), the keywords used for the searches were: fitness equipment, resource, and variable. The first term has been intersected (dependent variable), using a Boolean logic ‘AND’, with the remaining two. The references of each selected paper has been assessed to identify other potentially relevant papers that were not included among the indexed databases utilised by using the known ‘snowball’ technique (Atkinson & Flinton, 2001).

With this additional inclusive logic, articles from other electronic investigation sources have been used for the for the enlargement of the literature analysis. The reference list also included papers obtained from: Academic Search Complete, CINAHL, Cochrane Library, PsycINFO, Ergonomic Abstracts, Business Source Premier, Science Direct, and Google Scholar.

The titles and abstracts sorted were screened to remove irrelevant or duplicated publications. The full-text versions of the remaining papers were then read, analysed, and evaluated in detail to identify their eligibility.

Once the relevant publications for the definition of the state of the art were finalised, the Jadad Scale was used to systematically determine the quality of the papers for approval and acceptance (Jadad et al., 1996). The standard set for selection was all articles that earned a punctuation of 3 (or more) points, which is an indication of high quality. As example, if the examined article separately faces only one of the pre-determined search keywords, didn’t obtain the minimum score to be listed in the targeted literature evaluation. Having been done entirely by a single reviser, a good standard of the results was sought for analysis selection.

Study selection and methodological quality assessment

The inclusion criteria of the selected articles were as follows: (1) articles have been sorted with no limit on investigation areas; (2) publications related to the content criteria for ‘fitness equipment’ that were published through academic journals and directly intersected (Boolean logic ‘AND’) with the topics of ‘resource’, and ‘variable’, that should appear in the title, abstract, or keywords; (3) where aims were not included in those topics, has been analysed if has been extensively faced...
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or treated between the offered contents of the full-text version; and (4) papers written in English (Table 1).

Table 1. Literature analysis criteria and approaches.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Adopted approaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main topic</td>
<td>fitness equipment</td>
</tr>
<tr>
<td>Related topics</td>
<td>(a)resource, (b)variable (Boolean ‘AND’)</td>
</tr>
<tr>
<td>Research methods</td>
<td>databases search, snowball technique</td>
</tr>
<tr>
<td>Evaluation method</td>
<td>Jadad Scale</td>
</tr>
</tbody>
</table>
| Boundaries defined| (1)title, abstract or keywords include topics (first phase)
                  | (2)full-texts content articles analysis (second phase)
                  | (3)assessments through Jadad Scale (for articles approved in first and second phases)
                  | (4)NOT by investigation areas
                  | (5)NOT by period/time frame
                  | (6)publications in English |

Data analysis

The chosen method enables to identify, analyse, and report themes of meaning from different points of view (De Lyon et al., 2017). Owing to manage eclectic data, the rationale for this approach has been considered as a pragmatic tool for the specificity of the study aims.

Once the publications have been selected, the author proceeded formally on to data extraction. All the papers were categorised according to its nature by the criteria of the reviewer who proceeded to sort them in four main themes: (1) databases; (2) tangible qualities; and (3) intangible qualities. Additionally, starting from the same milestones encountered, among the study findings has also been proposed an (4) innovative way to categorize products inside fitness industry, the Fitness Application ‘Punnett Square’ (FAPS), not already defined under this point of view until today.

Results

Databases

The starting search exposed 471 publications. However, most were eliminated based on repetitive appearances among the four indexed databases assessed, or article’s main topics discrepancy (title, keyword, abstract), or full text contents that had nothing to do with the relevant subject matter for this study. Ultimately, 29 articles met the criteria (Table 2).

<table>
<thead>
<tr>
<th>Databases</th>
<th>Keywords</th>
<th>Total</th>
<th>Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medline</td>
<td>fitness</td>
<td>AND</td>
<td>resource</td>
</tr>
<tr>
<td></td>
<td>equipment</td>
<td></td>
<td>variable</td>
</tr>
<tr>
<td>ISI (WoS)</td>
<td>fitness</td>
<td>AND</td>
<td>resource</td>
</tr>
<tr>
<td></td>
<td>equipment</td>
<td></td>
<td>variable</td>
</tr>
<tr>
<td>Scopus</td>
<td>fitness</td>
<td>AND</td>
<td>resource</td>
</tr>
<tr>
<td></td>
<td>equipment</td>
<td></td>
<td>variable</td>
</tr>
<tr>
<td>SportDiscus</td>
<td>fitness</td>
<td>AND</td>
<td>resource</td>
</tr>
<tr>
<td></td>
<td>equipment</td>
<td></td>
<td>variable</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>471</td>
</tr>
</tbody>
</table>

The initial search resulted in 29 articles, of which 19 were used when the previously explained criteria based on intended content was applied. During the last forty years, when considering the decades of publication, an increase in article addressing the topic of interest can be observed (Table 3).

<table>
<thead>
<tr>
<th>Decades</th>
<th>Publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978-1987</td>
<td>2</td>
</tr>
<tr>
<td>1988-1997</td>
<td>3</td>
</tr>
<tr>
<td>1998-2007</td>
<td>1</td>
</tr>
<tr>
<td>2008-2017</td>
<td>13</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>19</td>
</tr>
</tbody>
</table>

From 1978 (lower limit defined during the analysis) to 2007, over a period of thirty years, only 6 articles were published (31.58%). In the last 10 years (from 2008 to 2017) the most has been provided from the final selection, with almost seven articles out of ten (68.42%).

Undoubtedly, the principal focus of the investigation, due to the provided literature lacks, has been in relation to all those intangible variables which could be put in relation to both physical or digital fitness resources.

Tangible Variables

For obvious reasons and societies’ request, the scientific literature tends to highlight everything which is labelled as corporal and tangible. The main areas of investigation include (in alphabetical order): acoustics, anthropometric (biomechanical and physiological) parameters, brand (attachment, equity, position, and vitality), design specialty, IT aspects (digital interface supports, prior to the latest virtual reality applications), safety and comfort practices, size and mass, and source type or energy storage.

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These variables are mainly studied through a process of identification and detection of ‘man-machine’ problems (including validation, risk and discomfort issues) that manufacturers (technical support departments) try to avoid in every phase of the production. Academic researchers also reflect these industry trends.

In order to amplify the product usability to different groups of consumers, the structure needed to meet the ergonomic requirements, and be planned in order to render the patterns more comfortable (Long et al., 2009). Training on physical apparatus has a similar emphasis on exercise specificity by the required physiological movements (Reilly & Lees, 1984).

A relevant investigation pathway is the one connected to the modern technologies (personal computers of every extraction, tablets, smartphones, etc.) where exercise devices could normally be perceived, even closer, to the people’s ways of workout (Wang & Su, 2012).

Intangible Variables

For what emerged from the academic literature, the defined ‘B side’ of fitness resources is represented by all those intangible aspects of the products that have been created during the last decades. Nowadays conspicuous market models are proving that non-material facets are increasingly required by international societies and contexts and are demonstrated to be incredibly useful, more so than in previous decades. For these reasons manufacturing realities inside fitness industry are lately focusing their attempts in product’s improvement especially in these directions.

International guidelines recommend vigorous PA an average of two or three times per week, with 30/45 minutes exercise ‘bout’ each session, as the recommended duration. Yet, how can intangible variables (Figure 1) be prescribed and included into these active ways of move?

Starting with what offered by the selected articles, a complete overview has been enunciated in the following paragraphs. The logical appearance of the variables has been defined based on the appraisal and the induced importance, not by the number of citations obtained for each quality. Moreover, the final scope of this qualitative evaluation is the attempt to unite, with a logical thread, every variable detected in order to provide a more complete vision.

A single workout needs to be (a) efficient (Kennedy-Armbruster et al., 2011; Yoon & Ahn, 2015), which includes the sensation of being effective throughout the exercise period. It could be also related to the development of one’s muscular-intellectual capacities in terms of recognizing personal limits (e.g. physical exhaustion or burnout) and overall functionality (the real word meaning, and not the latest functional training concept brought by PA trends). One of the most high-valued qualities of fitness resources, very commonly highlighted in recent market trends (such as ‘high intensity exercise experiences’), is the generated (b) engagement (Annesi & Mazas, 1997; Sasso & Backus, 2013; Parvaiinen, 2011a; Algar, 2017). This aspect is correlated with several other ‘facets’, most of them subjective, i.e. dependent on final user types. More broadly, this feeling could be generated by a sense of challenge or long-term commitment, e.g. PA goals based on ‘seeing’ the progresses (Dibble, 1989).

In various aspects of life, as well as in products and services, human beings detect and choose everything which is labelled as (c) attractive (Reilly & Thomas, 1978; Parvaiinen, 2011a). This topic is explicable through psychological constructs: moving from aroused curiosity, to the real step into motivation (defined as the sum of intensity and direction chosen). Examples of attractive features of the H&F industry include ‘sensory’ inputs such as music and video feedbacks (Mestre et al., 2011), or the way in which general exercise machineries user sees the same: regular until yesterday, multi-station equipment from today. Another relevant factor is the (d) attendance and the constancy during the selected quantity of frequency (Annesi & Mazas, 1997; Dibble, 1989; Mestre et al., 2011). This aspect should also be understood in relation to the psychological sphere and to specific goals that include ‘extra-sectoral’ benefits. The next step is the real obtained (e) adherence in the planned audience (Park, 1996; Annesi & Mazas, 1997; Mestre et al., 2011; Tsitskari & Tsakiraki, 2013), deeply debated in the scientific literature under the label of retention. This variable is strictly related to the constructs of engagement and effective implications. Which aspects of the products are generating these subjective mental constructs in every individual? Probably one of the answers is the psychophysics ‘attention’ during a specific PA, and it is defined as (f) involvement (Park, 1996; Annesi & Mazas, 1997; Mestre et al., 2011; Tsitskari & Tsakiraki, 2013). One of the most widely-used strategies to amplify the potentialities of this fac-

![Figure 1. Untouchable and intangible variables (qualities) included in H&F products and services (resources).](image-url)
tor is the introduction of the gamification (merely playful areas), which not only limited to the developmental (youthful) life span. During standardized PA, for example, this should represent the decontextualization of the game and its extension to other related contexts (with the outcome, for example, of less perceived effort in final consumers).

Moreover, in relation to the involvement variable, there is the basic concept of (g) interaction (Annesi & Mazas, 1997; Dibble, 1989; Mestre et al., 2011). This refers to the manner in which any kind of user interfaces with the specific resource, also defined as man-machine (or ‘machinic’) relation. This aspect could be amplified among more people (peers) at the same time, and be considered in relation to the case of the ‘choreographed’ services where clients are steered to impersonal co-motion (Parviainen, 2011a). With this market solution instructors are fundamental to keeping people ‘on the move’ through attractive personality and inter-passivity. In this specific case, could sector professionals be considered a tangible quality useful to carry out the digital activities? Consumer’s attentional focuses are based on ‘gaze strategies’ (fixation location and time) and, in the meantime, the public do not feel that they are an active part of a ‘global machinery’.

Another important variable studied is whether a resource is viewed as (h) emotional or sensational (Parviainen, 2011a). This is also known as the ‘Wow!’ effect and, as in the case of attractiveness, could represent a real psychophysical necessity which leads users to want it more and more (or investors to bet on it). As in the involvement application, the (i) enjoyment sphere is often seen mainly in relation to the youth market; but this view is not evidence-based and partially expired (Dibble, 1989; Mestre et al., 2011). The sense of, or taste for, pleasure is inevitably and unconsciously sought in every life stage and, of course, welcomed too during movement and exercises. This variable is strictly related to engagement, of which it could be an effective causative. During recent years, one of the preferred ways of trying to level up this independent factor (and as well long-term maintenance) has been the introduction of virtual reality (VR) and, latterly, augmented reality. An exercise routine needs also to be (j) beneficial in terms of effects and perceived feelings, both during the effective performance and after the ‘active interfacing’ (Kennedy-Armbruster et al, 2011). Both trained bodies and more normo-type ones, generate a dose of endorphins immediately after a classic session. Additionally, when a user includes any kind of PA in their daily life they could see improvements in everyday-living actions, especially in the case of senior-adulthood and elderly categories (kinesthetic homeostasis, joints mobility, etc.).

Additional (k) extra accompanying variables (Figure 2), which also benefit all the intangible elements required for the complete ‘triumph’ of a specific product or service, always need to be reported in relation to a chosen environment or market model (Annesi & Mazas, 1997). Between the main sensations and feelings that emerge there are seven spheres (in alphabetical order): dissociation (mental), physical exhaustion (endorphins procreation and cells recreation), regulated competition (personal and bidirectional to the activity chosen, or among peer constructs during group exercises), revitalization (physiological and bioenergetic facets), self-expression (body mastery), sense of challenge (interior and exterior), and tranquillity (during, but mostly after workouts).

Fitness Applications ‘Punnett Square’ (FAPS)

Despite what detected in the available academic literature, but starting from the milestones included in the same assessment, in this results section seems necessary to redefine a new method to categorize fitness equipments. This concept started from a qualitative evaluation of resource and quality types forms of exercise, that are the basis of the fitness industry applications.

Which insertable evidences are available in relation to the intangible (untouchable) variables? Are these aspects relevant to the final applicability and usability (ultimate aims) of H&F market models?

Economical ‘specialty’ quality for this sector, has been view
under another perspective, and has been defined as the result of these non-material variables which reflect their potentiality and optimization processes in the daily-life utilization of any kind of fitness resources, and evidently direct related to every sector professionals application.

With the goal of better clarifying the current situation, or at least creating a pragmatic approach to the problem, the Fitness Applications ‘Punnett Square’ (FAPS) tool has been constructed and introduced, based on the famous and widely-used bio-genetic field approach (Figure 3). This method is founded on the logic of the dominant and regressive characters of the evaluated variables (in the original case, genes or miscible elements). Using the same logic, this innovative model presents both dominant and recessive facets of resources and qualities with which the fitness industry provides its wide range of movement forms. For convenience tangible/physical variables have been coded as dominants, and intangible/non-material variables as recessives.

Depending on which kind of activities (macro-areas) are included in each dial (quadrant) it is evident how the recessive character of the enounced qualities (lower case and blue in the image) is the same, and could be shared for both categories (color yellow), cancelling the ‘border’, of available resources (Figure 4). In this respect, it is right that both academics and corporations should want to discover more in order to plan the and anticipate the next stages of this continuously growing industry.

Each dial it is not an autonomous ‘world’, as chemicals might be, but exists in correlation with other dials and should complements the other practical applications. For this reason, many ways of movement or products (physical or not), included more than one category at the same time.

**Discussion**

Fitness industry scientific timeline goes ‘hand in hand’ with the ‘real’ life development of the sector, in fact the articles begin to appear from the end of the 70’s of the past century and arrive until today for a total span of forty years. It is obvious how, with the introduction of the IT in the last decades (Parviainen, 2011a; Wang & Su, 2012), the publications on fitness equipment took broader approaches (with several others sub-fields with which cooperate), but also evidently grow in terms of number of productions (in this case almost 70% produced in the last ten years assessed).

Sport Discus represents the most comprehensive data-base in which articles have been positively retrieved, and it is an ideal tool for practitioners who carry out researches in the fields of fitness, health and sports studies (with a massive quantity of material also in relation to sports medicine, physiology, psychology, and physical education & recreation).

According to Takaki (2005) it has been evidenced how, nowadays, the limit between fitness goods and service it is evanescent in terms of resource extraction, and the main reason is due to the ways in which these means are normally delivered (with or without material support) and embracing the concept of quality extraction. The FAPS model underlined how the intangible qualities could be the same for both material or non-material fitness amenities, and this fleeting frontier could represent a real step into the inclusion and evolution of the same resources.

One of the best, in terms of manufacturing industries focuses inside fitness sector, is to create physical products which could also include a wide number of untouchable qualities, but most of processes didn’t evaluate other comprehensive

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**Figure 3. Fitness Application ‘Punnett Square’, variables division in dials.**

<table>
<thead>
<tr>
<th>Qualities</th>
<th>Resources</th>
<th>R</th>
<th>RQ</th>
<th>Rq</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>x</td>
<td>X= Dominant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>q</td>
<td>r</td>
<td>x = recessive</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend (characters of variables)

Each dial it is not an autonomous ‘world’, as chemicals might be, but exists in correlation with other dials and should complements the other practical applications. For this reason, many ways of movement or products (physical or not), included more than one category at the same time.

**Figure 4. Fitness Application ‘Punnett Square’, dial divisions by PA macro-area ways of exercise definitions.**

<table>
<thead>
<tr>
<th>Qualities</th>
<th>Resources</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(movements on)</td>
<td>Regular Equipments</td>
</tr>
<tr>
<td></td>
<td>(training concepts or movements)</td>
<td>based on) NON-Material-themed Amenities</td>
</tr>
<tr>
<td>Intangible</td>
<td>Service</td>
<td>based on) Material-themed Amenities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fleeting” frontier</td>
</tr>
</tbody>
</table>
ways to elaborate solutions inside the FAPS dials in cooperation with the remaining ones (opposite or completion processes). For example, in the actual applications available, all the definable support generated by these kind of non-mater-  
al variables (applied to any resource kind) is still weak, or not developed with criteria.

As encountered in various literature definitions, fitness equipments have always been categorised according to quantitative definition (Strand et al., 2010; Bennie et al., 2016) such as: division for energy/exercise expenditure categories, related physical 'summon' based on PA types, final consumer workouts goals, etc. Today it is possible to amplify these correct sub-divisions also proposing a qualitative approach as introduced in the FAPS method.

Conclusions

This traditional literature analysis offered and enounced a complete vision on how fitness equipments qualities have been categorized inside fitness industry. Not only through quantitative or exercise typology assessments, such as energy expenditures or capacities required to work out categories (on a material or untouchable resources), but also facing qualitative facets of the same.

For this reason, depending on the FAPS dial in which a product or service is included, it is necessary to emphasize specific variables to make sure of their applicability and usability, and keep them on the ‘tracks’ required by today’s societies, contexts and markets. The FAPS model facilitates new sectoral approaches to better define what already exists and all that will probably come soon (Figure 5). The final aim of the contribution is to stimulate both academics and corporations (in a ‘win-win’ situation for both entities) to schedule investigations which could include these relevant aspects for the final economical specialty applications (public: targeted request, industry: ad hoc proposal).

Strengths and limitations

The Author acknowledge both strengths and limitations to the approach adopted for reviewing and analysing the existing literature evidences. The most strength emerged, is the level of flexibility offered by the adopted approach. This has enabled to include a wide variety of information without being impeded by strict or inappropriate inclusion/exclusion criteria. Moreover, the iterative approach allowed us to refine the analysis based on newly discovered material throughout all the analysis duration.

The first limit is in relation to the number of scientific
databases used and the keywords selected, which could have been expanded to include more academic supports, or conversely less strict in the way of including more papers (high acceptance levels).

Another example is the one linked to the nomenclature: during the snowball technique ‘rounds’ it has been necessary to assess articles which used synonyms in order to include more valid sources, maintaining the same adopted rating scale. Along the same lines, the selection criteria has excluded a wide number of publications emerged from indexed databases. In the most of the case the complete irrelevance was due to the fact that the material was not academic (but equally appeared in databases) and merely represented registered patents or licenses of the products.

References