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MULTIPLE NEIGHBORHOODS IN TABU SEARCH: SUCCESSFUL APPLICATIONS FOR OPERATIONS MANAGEMENT PROBLEMS

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ABSTRACT

A *metaheuristic* is a refined solution method able to find a satisfying solution to a difficult problem in a reasonable amount of time. A *local search* metaheuristic works on a single solution and tries to improve it iteratively. *Tabu search* is one of the most famous local search, where at each iteration, a neighbor solution is generated from the current solution by performing a specific modification (called a move) on the latter. In contrast with most of the existing literature, the goal of this paper is to present tabu search approaches where different neighborhood structures (i.e., different types of moves) are jointly used. The discussion is illustrated for various operations management problems: truck loading, job scheduling, inventory management, and dimensioning of assembly lines.

KEY WORDS: optimization, operations management, tabu search, metaheuristics.

1. INTRODUCTION

Let f be an objective function which has to be minimized (e.g., a cost function). A solution s is *optimal* for f if there is no better solution than it, that is, there is no solution s' such that $f(s') < f(s)$. As mentioned in (Zufferey & Vasquez, 2015), an *exact* method guarantees the optimality of the provided solution. However, for a large number of applications and most real-life optimization problems, such methods need a prohibitive amount of time to find an optimal solution, because such problems are NP-hard (Garey & Johnson, 1979). For these difficult problems, one should prefer to quickly find a satisfying solution, which is the goal of *heuristic* and *metaheuristic* solution methods. There mainly exist three families of (meta)heuristics: *constructive* algorithms (a solution is built step by step from scratch, like the *greedy* algorithm where at each step, the best element is added to the solution under construction), *local search* methods (a solution is iteratively modified: this will be discussed below), and *evolutionary* metaheuristics (a population of solutions is managed, like genetic algorithms and ant algorithms). The reader is referred to (Gendreau & Potvin, 2010; Zufferey, 2012b) for more information on metaheuristics and general guidelines to adapt them.

Only the context of local search methods is considered in this work. A local search algorithm starts with an initial solution and tries to improve it iteratively. At each iteration, a modification, called a *move*, of the current solution s is performed in order to generate a neighbor solution s'. Let $N(s)$ denote the set of all neighbor solutions of s. The definition of a move, that is the definition of the *neighborhood structure* N, depends on the considered problem. Popular local search methods are the descent local search, simulated annealing, tabu search and variable neighborhood search.

In a *descent local search*, the best move is performed at each iteration and the process stops when a local optimum is found. *Tabu search* was proposed by Fred Glover in the 80's and is nowadays still considered as one of the most efficient method for exploring the search space. Tabu search has a good balance between *exploitation* (i.e., the ability to guide the search in the solution space and to take advantage of the problem structure) and *exploration* (i.e., the ability to visit various zones of the solution space). Indeed, to prevent tabu search from being stuck in a local optimum, when a move is performed, the reverse move is forbidden (i.e., set as *tabu*) for *tab* (parameter) iterations. In most tabu search algorithms, only one neighborhood structure N is used. The goal of this paper is to present tabu search approaches where at each iteration, different neighborhood structures N_1, N_2, ..., N_q are used. The resulting method, denoted MNTS (for *Multiple Neighborhoods in a Tabu Search*), is presented in Algorithm 1, where s^* denotes the best visited solution (returned at the end to the user). The motivation of using several neighborhood structures is the following.

A *local optimum* according to neighborhood structure N is a solution s such that there is no solution in $N(s)$ which is better than s. Let N_1 and N_2 be two different neighborhood structures. Obviously, if s is a local optimum according to N_1, it may not be a local optimum according to N_2. In other words, if a N_1-move is not able to improve s anymore, then a N_2-move may do it.

Algorithm 1: MNTS (*Multiple Neighborhoods in a Tabu Search*)

Generate an initial solution s and set $s^* = s$.

While no stopping criterion is met, do

- from the current solution s, generate the best non-tabu neighbor $s' \in N_1(s) \cup \ldots \cup N_q(s)$;
- forbid the reverse move for *tab* (parameter) iterations;
- set $s = s'$;
- if $f(s) < f(s^*)$, set $s^* = s$;

In order to design a MNTS for a specific problem (P), the following ingredients have to be defined: a way to encode a solution s, an objective function f, the various neighborhood structures $N_1, \ldots, N_q$, the tabu list structures (i.e., the nature of the forbidden moves), and the stopping condition (e.g., a time limit, a specific number of iterations). Strongly relying on (Respen & Zufferey, 2013; Thevenin et al., 2013; Zufferey, 2014; Zufferey, 2012a), the discussion is illustrated for various operations management problems, namely truck loading (Section 2), job scheduling (Section 3), inventory management (Section 4), and dimensioning of assembly lines (Section 5).

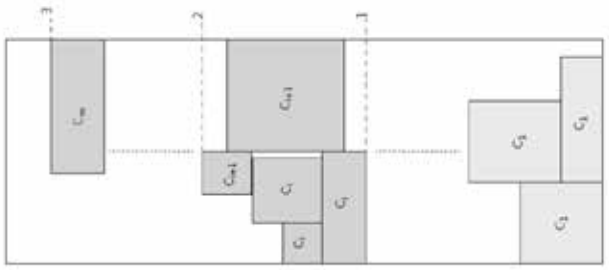
2. MNTS FOR TRUCK LOADING

2.1. Presentation of the considered problem (P)

The French car manufacturer *Renault* daily faces a complex truck loading problem (P), where items need to be placed in a truck while satisfying different constraints. More than a thousand trucks are daily considered to deliver components to the car plants. As a single truck can deliver goods to different delivery points, *classes* of items are defined, where a class is associated with a delivery point. Each problem instance contains the size of the truck and the various sizes of all the items that must fit in. The heights of the items can be ignored as they rely on complex factory constraints which are supposed to be already satisfied. At first sight, (P) seems related to a strip-packing 2D problem with rotation, which has been already covered by many research papers (e.g., Hopper & Turton, 2001; Lodi et al., 2002; Ntene & van Vuuren, 2009; Riff et al., 2009). (P) is NP-hard, and *Renault* even showed in (Nguyen & Brenaut, 2009) that no exact method can be competitive to tackle their real instances. Therefore, (meta)heuristics are more than relevant.

Problem (P) can be formally described as follows: a number n of items, each one belonging to a specific class C_i (with $i \in \{1, \ldots, m\}$ such that $m \leq n$), need to be placed in a truck such that all the items belonging to the same class are adjacent. In addition, the classes must be placed in an increasing fashion from the front to the rear of the truck. More formally, the ordinate of the origin item which belongs to class C_i (label 1 on Figure 1) must be strictly smaller than the ordinate of the extremity of any item of class C_{i+1} (label 2 on Figure 1), and such that the ordinate of the extremity item (the closest one to the rear) of class C_m (label 3 on Figure 1), denoted as f, is minimized. The truck size is a hard constraint to fulfill, as it is not allowed to exceed neither its length nor its width.

Figure 1. A possible solution (view from the top of the truck, with rear on the left)



Because of the specificity of (P) (e.g., different classes of items, a significant number of items per truck in conjunction with a large standard deviation of the sizes of the items), it is not possible to take advantage of the existing exact algorithms (e.g., (Martello & Vigo, 1998; Martello et al., 2003; Lesh et al., 2004; Pisinger & Sigurd, 2005; Puchinger & Raidl, 2007)) to tackle it. Additional references on the topic can be found in (Lodi et al., 1999; Respen & Zufferey, 2013).

To solve (P), *Renault* proposes a simple but efficient greedy heuristic (denoted *SG*), and an advanced greedy heuristic called *look-ahead greedy* (denoted *LAG*). An important aspect is the tradeoff between the computing time and the solution quality. As *LAG* is fast, another metaheuristic is only relevant if it is fast and leads to improvements. *SG* builds a solution from scratch, and at each iteration, selects an item (following different possible rules) from a list L of non-already inserted items, and adds it to the solution at minimum cost (i.e., which minimizes the augmentation of f, label 3 of Figure 1). This process stops when L is empty. In *LAG*, at each iteration, the algorithm tries each item j of L, and for each j, tries the next p (parameter) insertions following this possible insertion of j (look-ahead process). At the end of the iteration, the item j that would involve the lowest cost in the next p iterations is selected and inserted at the best position. As before, this process stops when L becomes empty. Both *SG* and *LAG* algorithms are fast (a few seconds per run), and therefore relevant to *Renault*. The two methods perform restarts as long as a given time limit T is not reached. When T is reached, the best generated solution is returned.

2.2. Tabu search for (P)

Working with *encoded* solutions is relevant to tackle (P) within the framework of local search methods. An encoded solution *s* is actually a list of elements. To build a solution and compute its quality, a *decoding greedy algorithm* (*DGA*) is performed on the encoded solution. It decodes the solution *s* into a real solution s^{real}, and then returns the total length of the truck load *f*. To drive *DGA*, information (some are mandatory and others are optional) are carried in each element of *s*, and can contain the item identifier (*ID*, mandatory), the class identifier (*C*, mandatory), the item orientation (*O*, optional), and the item side (*S*, optional). Thus, component *i* of the solution *s* takes the form $s_i = (ID_i, C_i, O_i, S_i)$, where $ID \in \{1, \ldots, n\}$, $C \in \{1, \ldots, m\}$, $O \in$ {not rotated, 90-degrees rotated}, and $S \in$ {left-sided, right-sided}. *DGA* thus decodes the vector *s* into a real solution s^{real} by inserting in s^{real} the items from *s* in a FIFO order, and using the *O* and *S* information (if provided) while respecting the class constraint. At each step, *DGA* pops the next item *i* of *s*, greedily loads it in the truck, while respecting C_i, O_i and S_i. If O_i (or S_i) is not provided, *DGA* can decide by itself its value (minimizing the augmentation of *f*), and thus owns more freedom.

The decoding process is illustrated on an example. Five items, initially oriented as presented in Figure 2, have to be placed in a truck. A possible encoded solution is the following: *s = ((ID$_1$, 1, not rotated, right-sided), (ID$_3$, 1, 90-degrees rotated, right-sided), (ID$_2$, 1, 90-degrees rotated, left-sided), (ID$_5$, 2, ?, ?), (ID$_4$, 2, ?, right-sided))*. The corresponding decoded solution s^{real} is illustrated in Figure 3. To generate this solution, *DGA* performs the following steps: it pops the first element ID_1 and loads the corresponding item on the right side, without rotation. At that time, the next item, namely ID_3, is loaded on the right with a 90-degrees rotation. Then item ID_2 is loaded on the left with rotation whereas ID_5 is inserted at the best possible position tried by *DGA* while respecting the class constraint. Finally item ID_4 is inserted on the right side but *DGA* decided its orientation. When *DGA* is over, it returns the value *f*, which is in this example the extremity of item ID_4.

Figure 2: Items (with initial orientations)

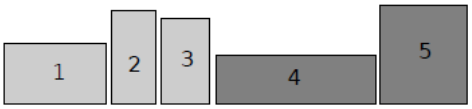
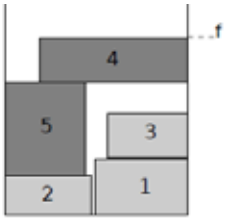


Figure 3: Decoded solution s^{real} (top view)



To generate a neighbor solution *s'* from the current solution *s*, the seven following neighborhood structures are possible:

- N_1: move item *j* from position *x* to position *y*;
- N_2 (resp. N_3): move item *j* from position *x* to *y*, and switch to the opposite value its orientation *O* (resp. side *S*);
- N_4: move item *j* from position *x* to *y*, and switch *S* and *O* to the opposite values;
- N_5 (resp. N_6): switch *O* (resp. *S*) to the opposite value;
- N_7: switch *O* and *S* to the opposite values.

All the moves are performed while respecting the class constraint, and ties are broken randomly. Four different tabu search approaches are developed, denoted TS_1, TS_2, TS_3 and TS_4. The notation *TS* is simply used if it refers to common features of the four tabu search algorithms. *TS* starts from an initial encoded solution where items are ordered by decreasing areas. TS_1, TS_2, TS_3 and TS_4 differ in the sense that for TS_1, only the information *ID* and *C* is contained in each element of the encoded solution. TS_2 contains *ID*, *C* and *O*. TS_3 contains *ID*, *C* and *S*. TS_4 contains *ID*, *C*, *O* and *S*. Thus, for TS_1, *DGA* can decide on its own the orientations and the sides (while focusing on the smallest augmentation of *f*). In TS_2 and TS_3, *DGA* has the order in which the insertion must be made, and the orientation or the side of each item (but not both). Finally TS_4 constraints *DGA* at the maximum level due to the complete information set contained in each component s_i of the vector *s*. In *TS*, only a fraction *v* (set to 50%) of the possible moves are generated (it allows to performing more iterations for a same time limit, and helps in bringing more diversification). After each move, the tabu tenure *tab* is set to a uniformly distributed value between 25 and 55.

2.3. Results

The above methods are compared on a set of 30 real benchmark instances provided by *Renault*. Tests were performed on an Intel Quad-core i7 @ 3.4 GHz with 8 GB DDR3 of RAM memory. The time limit *T* is 1800 seconds (as validated by practitioners). The results are summarized in Table 1. The first two columns indicate the values of *n* (number of items) and *m* (number of classes) of each instance. Column *f** indicates to the objective function value of the best solution ever found by any of the algorithms. The following column reports the percentage gap between the solution of *SG* and *f**. The next columns provide the same information for the other methods. The last rows give the average gap and computing time for each method. As *SG* and *LAG* are greedy constructive methods with restarts, it is not relevant to indicate their computing times.

Table 1. Computational results (averaged over 5 runs for tabu search)

n	*m*	*f**	*SG*	*LAG*	TS_1	TS_2	TS_3	TS_4
23	1	12840	1.01	0.86	4.6	0.06	0.21	0.92
25	1	13000	3.85	0.31	3.85	0	0.05	0.98
24	1	12920	1.32	0.08	1.39	0	0.06	0.38
25	1	13040	3.76	0.31	3.76	0	0	0.6
26	1	13460	0.15	0.07	0.15	0	0	0.01
20	2	13610	6.83	1.25	14.11	0	1.25	0.53
23	1	12980	3.08	0.08	6.63	0	0	0.26
25	1	14120	4.02	4.01	3.75	0.07	0	0.26
18	4	13295	0.56	0.15	24.69	0	0.05	0.18
23	3	12852	5.23	0.5	18.67	0	0.03	0.16
20	2	13330	9.08	0.6	12.08	0	0.08	0.08
17	3	13070	0.23	0.15	14.77	0	0	0
25	1	13390	1.12	0.97	1.05	0	0.16	0.42
20	2	13150	7.53	1.52	12.09	0	0.61	0.67
20	4	13325	4.68	2.42	25.77	0	2.65	0.11
24	1	13010	3.69	0.46	3.61	0	0	0.52
23	4	12902	3.36	2.19	6.17	0.02	1.02	0.39
24	1	13380	1.12	0.6	4.11	0	0	0.04
24	1	13380	1.12	0.6	4.11	0	0	0.04
23	1	13040	3.68	0.23	6.75	0	0.05	0.26
25	1	13020	3.76	0.23	3.76	0	0	0.53
25	1	13380	0.82	0.6	0.75	0	0	0.2
24	1	13380	1.12	0.6	4.04	0	0	0.01
18	2	11530	10.41	0.95	11.88	0	0	0
23	1	12550	21.12	0	9.96	0	0	0
19	2	12170	6.98	0.33	9.2	0	0	0
23	1	13070	3.83	0.23	6.96	0	0.05	0.51
25	1	13380	0.75	0.6	0.75	0	0	0.12
20	1	13300	1.5	1.13	17.29	0	0.18	1.01
25	1	13080	3.59	0.08	3.59	0	0	0.28
Average gaps			**3.98**	**0.74**	**8.01**	**0**	**0.21**	**0.32**
Average times [s]					**176**	**232**	**240**	**645**

The superiority of *LAG* over *SG* is significant. This is mainly due to the fact that *LAG*, with the parameter *p*, explores the impact of future possible insertions. Tabu search does not show amazing improvements on the greedy heuristics. One can conjecture that it is due to the fact that *f** is not far from the optimum. TS_1 is a method to avoid as it obtains poor results. This is probably due to the full freedom given to *DGA* to build a solution, when compared to the other algorithms. TS_4 is less competitive than TS_2 and TS_3. This can be easily explained by the fact that TS_4 does not let *DGA* any choice on the solution building. It is thus not surprising that TS_4 is the fastest method (regarding the time needed per iteration) of the *TS* family, as *DGA* does not have to perform many tests to insert an item at the best position. However, even if TS_4 it is the fastest method per iteration, it is the slowest method to find its best solutions. Experiments clearly show that some freedom should be given to *DGA*, as TS_2 and TS_3 are the most powerful tabu search methods. Remember that the difference between TS_2 and TS_3 is the carried information *O* or *S*. As TS_2 has the minimum gap on 29 instances over 30, it shows that *O* is the most important feature to carry in the encoded solution *s*. This can be explained in the sense that the orientation *O* has an important impact, as it clearly drives s^{real} by forcing the orientation of each item.

3. MNTS FOR JOB SCHEDULING

3.1. Presentation of the considered problem (P)

On the one hand, the range of problems consisting in selecting a subset of given jobs, and then in scheduling them in order to minimize rejections and some other costs, are called *order acceptance and scheduling* problems (OAP). It has been studied in various scheduling environments and a review is given in (Slotnick, 2011). Such problems are particularly relevant in make-to-order production systems (Zorzini et al., 2008). On the other hand, earliness and tardiness penalties have captured a lot of attention due to their correspondence with the just-in-time paradigm. In (Valente & Gonçalves, 2009), it is mentioned that the use of quadratic tardiness functions is appropriate to model customers' dissatisfaction. In (Valente et al., 2011), the authors emphasize that quadratic penalties avoid situations in which only a few jobs contribute to the objective function.

When the production capacity of a company is overloaded, all received orders cannot be performed on time. It then makes sense to reject some of them. In the considered problem (P), following the customers' requirements, a *due date* corresponds to the date at which an order has to be delivered. Late deliveries lead to customers' dissatisfaction, which is modeled by a quadratic tardiness penalty depending on the completion time of the job. The *deadline* corresponds to the point in time where the dissatisfaction associated with the rejection of the order, modeled by a rejection penalty, is equal to the dissatisfaction of delivering late. In other words, it is preferable to reject the order to allow the client to get its goods by another supplier. Usually, no job can be scheduled before its *release date*. It often corresponds to the date at which all the necessary raw material is ready to be used. In contrast, release dates can be reduced in (P) if a quadratic earliness penalty (depending on the starting time of the job) is paid. Obviously, there is a lower bound and no job can start before its *available date*. The use of controllable release dates is relevant in practice. As explained in (Shakhlevich & Strusevich, 2006), it may be profitable for the manufacturer and its suppliers to cooperate. In some cases, a supplier can allow to deliver raw material earlier, which reduces the release dates at the manufacturer's level. In counterpart, the manufacturer will pay a higher price to the involved supplier, which creates a win-win situation.

Between two consecutive jobs j and j' of different families F and F', a setup time $s_{FF'}$ must be performed and a setup cost $c_{FF'}$ is incurred. The considered problem (P) can be formally stated as follows. A set of n jobs is given, a subset of these jobs has to be selected and scheduled (without preemptions but idle times are allowed) on a single machine which can handle only one job at a time. For each job j are given: a processing time p_j, an available date R_j, a release date r_j, a due date d_j, a deadline D_j, and a rejection penalty u_j. Let C_j and B_j respectively denote the completion time and the starting time of job j. In a feasible solution, each accepted (i.e., not rejected) job j satisfies $C_j \leq D_j$ and $B_j \geq R_j$. The earliness and tardiness penalties are respectively defined as follows:

- $E_j(B_j) = w_j \cdot (r_j - B_j)^2$ if $B_j < r_j$, and 0 otherwise;
- $T_j(C_j) = w_j' \cdot (C_j - d_j)^2$ if $C_j > d_j$, and 0 otherwise.

The objective function to minimize is the sum of the three following components: (1) the setup costs $c_{jj'}$ between every successively performed jobs j and j'; (2) the rejection penalties u_j associated with each rejected job j; (3) the earliness and tardiness penalties $E_j + T_j$ for all accepted jobs j. In the context of (P), the reader interested in additional references is referred to (Yalçin et al., 2007; Oguz et al., 2010; Cesaret et al., 2012; Thevenin et al., 2013).

In (Thevenin et al., 2012), a greedy algorithm and a tabu search are proposed for a similar problem but with *regular* (i.e., non-decreasing) cost functions instead of earliness and tardiness penalties. In contrast with most scheduling objective functions, the one considered in (P) is not regular since earliness penalties are decreasing functions of the completion times. When objective functions are regular, most algorithms solving a single machine scheduling problem consist in finding an ordered sequence of jobs. From such a sequence, a schedule is easily built by starting each job as early as possible. In case of non-regular cost functions, the insertion of idle times may decrease the costs. Therefore, building an optimal schedule when a production sequence is given is not as easy, and can be time-consuming. The timing procedure proposed in (Hendel & Sourd, 2007) is adapted for (P), which is particularly efficient within the framework of local search algorithms.

3.2. Solution methods for (P)

To solve (P), a solution s is modeled by an ordered sequence $\sigma(s)$ of jobs, and a set $\Omega(s)$ of rejected jobs. Given such a solution representation, the timing procedure computes the starting and ending times of each job of $\sigma(s)$, such that the objective function is minimized. A greedy algorithm and a tabu search approach are now presented for (P). The first phase of the greedy method consists in sorting the jobs by increasing *slack time* $(D_j - R_j - p_j)$, where ties are broken by decreasing rejection penalties u_j. In a second phase, jobs are taken one by one in the previously defined order, and inserted in the schedule at the position minimizing the costs. Note that a job is rejected if it is better than inserting it. The insertions are enforced, that is, other jobs can be deleted to maintain feasibility. The associated repairing procedure is explained below.

Four types of straightforward moves can be used for tabu search. All moves are enforced by using one of the repairing procedures described later.

- N_1: *Add* takes a rejected job and inserts it in the schedule.
- N_2: *Drop* takes an accepted job and removes it from the schedule.

- N_3: *Reinsert* takes an accepted job and inserts it elsewhere in the schedule.
- N_4: *Swap*, exchanges the position of two jobs in $\sigma(s)$.

Five different tabu structures are designed. The first (resp. second) forbids to add (resp. removing) a dropped (resp. added) job during t_1 (resp. t_2) iterations. The third forbids to move a job which has been added/reinserted/swapped during t_3 iterations. The fourth forbids to move a job j between its two previous neighbors of $\sigma(s)$ during t_4 iterations, if j has been reinserted/swapped. As the cost function associated with each job is constant over the interval $[r_j, d_j]$, it induces plateaus in the search space. To escape from them, a tabu status is associated with the cost of the most recently visited solutions during t_5 iterations: it is forbidden to visit a solution whose cost is tabu.

As mentioned above, inserting a job may lead to an unfeasible solution due to available dates and deadlines constraints. To maintain feasibility, a repairing procedure must delete some jobs, and the choice of those jobs is a crucial point in local search methods for OAP. Note that a *Reinsert* move can be performed by a *Drop* move followed by an *Add* move, and a *Swap* move consists of two *Drops* followed by two *Adds*. As dropping a job cannot lead to unfeasible solutions, a repairing procedure is only needed for the move *Add*. Assuming that job j is inserted at position p, three repairing procedures can be compared.

- $REPAIR_1$. Remove randomly a job adjacent to position p until the insertion of j is possible. Deleting jobs which are adjacent to the insertion position reduces the shifting of other jobs, which is expensive with quadratic penalties.
- $REPAIR_2$. Let j' and j'' be two jobs such that j' is at the left of p, and j'' at its right. Jobs j' and j'' are *blocking* if by shifting j' (resp. j'') as most as possible towards the left (resp. right), the insertion of j is still not possible. $REPAIR_2$ deletes one of the closest blocking jobs to p until the insertion of j is possible. These blocking jobs are likely to be associated with large earliness/tardiness penalties, and dropping them should not be expensive.
- $REPAIR_3$. While the solution is not feasible, greedily remove a job (based on the costs).

3.3. Results

To generate a set of instances for (P), two critical values are used: the number n of jobs, and a parameter α which controls the interval of time in which release dates and due dates are generated. More precisely, a value *Start* is chosen large enough, and *End* is equal to $Start + \alpha \cdot \sum_j p_j$. Then, r_j is chosen in the interval [*Start*, *End*], and d_j in $[r_j + p_j, End]$. Basically, methods are likely to reject more jobs for small values of α. n belongs to {25, 50, 100, 200} and α to {0.5, 1, 2}. One instance for each pair (n, α) is generated. The weights w_j and w_j' are randomly chosen in {1, 2, 3, 4, 5}. D_j and R_j are chosen such that $T_j(D_j) = E_j(R_j) = u_j$. p_j is an integer randomly chosen in [50, 100]. As observed in realistic situations, the rejection penalty u_j is related to the processing time: $u_j = \beta \cdot p_j$, where β is an integer randomly picked in [50, 200]. The number of job families belongs to [10, 20]. Setup times and costs are likely to be related in realistic situations, therefore $s_{FF'}$ is chosen in [50, 200] and $c_{FF'} = \gamma \cdot s_{FF'}$, where γ is chosen in the interval [0.5, 2].

Four methods are compared. *Greedy* refers to the greedy method combined with $REPAIR_2$ (the other repairing procedures do not provide good results when combined with *Greedy*). TS_i is the tabu search using repairing procedure $REPAIR_i$ (with $i \in \{1, 2, 3\}$). Parameters $(t_1, t_2, t_3, t_4, t_5)$ are set to (80, 60, 90, 180, 30) for $n \in \{50, 100, 200\}$, and to (20, 20, 15, 25, 10) for $n = 25$. Average results (over 5 runs) are presented in Table 2, where the column f^* reports the best result found by any of the presented methods for the considered instance. In each cell is indicated the percentage gap between the average result obtained by the concerned method and f^*. The results clearly show the superiority of tabu search over *Greedy*, as the gap obtained by the best tabu search is 9.22%, versus 28.70% for *Greedy*. Tabu search with repairing procedure $REPAIR_3$ obtains the best results for 8 instances over 12, however the results obtained for large instances are bad. This is not surprising as $REPAIR_3$ is efficient but very slow. $REPAIR_2$ is slightly better than $REPAIR_1$: their respective average gaps are 9.22% and 10.22%. One would thus advise the use of repairing procedure $REPAIR_3$ for small instances, and $REPAIR_2$ for larger ones.

Table 2. Computational results

n	α	f^*	*Greedy*	TS_1	TS_2	TS_3
25	0.5	115361	0	0.13	0	0
25	1	28602	6.7	0	7.39	0
25	2	149134	0	0	0	0
50	0.5	237414	0.89	2.03	3.62	0
50	1	148237	12.88	13.12	11.39	4.22
50	2	38899	32.4	2.72	2.55	0
100	0.5	550950	5.36	3.33	4.69	1.11
100	1	339100	23.9	12.77	10.95	3.54
100	2	31706	176.18	57.88	42.38	204.47
200	0.5	934898	22.17	0.94	1.43	10.66
200	1	473244	68.62	3.03	4.62	84.63
200	2	42397	302.82	11.44	12.45	1586.88
Average			**28.7**	**10.22**	**9.22**	**23.7**

4. MNTS FOR INVENTORY MANAGEMENT

4.1. Presentation of the considered problem (P)

In most inventory management problems, two types of decision have to be made at the manufacturer level: *when* and *how much* to order to suppliers. It is assumed that setup, carrying and shortage costs are encountered during the year. Usually, inventory management models are characterized by stochastic demand and constant lead times. In contrast, the approach proposed in (Silver & Zufferey, 2005) and generalized below deals with the situation where there is a constant known demand rate, but probabilistic lead times whose probability distributions change seasonally. The lead times for different orders are assumed to be independent, thus crossovers can occur. Therefore, the interactive effects between different cycles (a *cycle* is defined as the time between two consecutive orders) due to the occurrence of shortages are difficult to model. Consequently, even if the annual *approximated* costs can be analytically computed with a mathematical function *f*, simulation (of the lead times) is the only way to compute the annual *actual* costs *F* of a solution.

The considered problem (P) was motivated by the management of raw material at a sawmill in North America. Without loss of generality, consider a 52-weeks planning horizon (a time period is a week). A solution *(P,S)* can be modeled by two vectors *P* and *S* defined as follows: P_t = 1 if an order occurs at the beginning of week *t*, and P_t = 0 otherwise; S_t is the order-up-to-level of available inventory at the beginning of week *t* if P_t = 1, and S_t = 0 if P_t = 0. The following reasonable assumptions are made. (1) It is possible to analytically *approximate* the annual costs with a function *f(P,S)* relying only on *P*, *S* and the probability distributions of the lead times. (2) It is possible to compute *F(P,S)* (i.e., the annual *actual* costs) with a simulation tool. (3) Based on *f*, it is possible to analytically compute *S* from *P* with a so-called *Compute(S|P)* procedure. As a consequence, anytime *P* is modified, its associated *S* vector can be immediately updated with *Compute(S|P)*.

4.2. Design of a solution method

Due to the non-stationarity in the lead time distribution, the problem is combinatorial in nature (choice of the P_t's and S_t's). Moreover, simulation is required to compute the actual cost of a solution. Thus, it makes sense to use (meta)heuristics. The solution space *X(N)* is defined as the set of all the solutions *(P,S)* with *N* orders. The approach consists in providing good solutions for different solutions spaces, starting with *U(N)* orders and ending with *L(N)* orders, where $U(N) \leq 52$ (resp. $L(N) \geq 1$) is an upper (resp. a lower) bound on *N*. At the end, the overall best solution is returned to the user. For a fixed solution space *X(N)*, the following steps are performed.

(S1) Generate an initial solution *(P,S)* with *N* orders as equi-spaced as possible.

(S2) Based on *f*, try to reduce the approximate costs of *(P,S)* with a tabu search $TS_f(P,S)$ working on *P* (using neighborhood N_1, as described below).

(S3) Based on *F* and without changing *P*, apply a descent local search *DLS(S)* working on *S* (a move in this neighborhood N_2 consists in augmenting or reducing an S_t by one unit).

In $TS_f(P,S)$, a move in the neighborhood structure N_1 consists in putting an order earlier or later, but without changing the global sequence of orders. When an order is moved, then it is forbidden (tabu) to move it again for *tab* (parameter depending on *N*) iterations. The stopping condition is a maximum number *Iter* (parameter) of iterations without improvement of the best visited solution.

An extension of $TS_f(P,S)$, denoted $TS_f^M(P,S)$, is now presented for step (S2). Instead of only providing a single solution, a set *M* containing *m* (parameter) promising local optima is provided (promising according to the quality function *f* and a diversity function *Div(M)*). To achieve this, additional ingredients are now defined. The distance between *P* and *P'* is $Dist(P,P') = \sum_t |P_t - P_t'|$. The distance between *P* and a set *M* of solutions is defined as $Dist(P,M) = |M|^{-1} \cdot \sum_{P' \in M} Dist(P,P')$. The *diversity* of a set *M* of solution is computed as $Div(M) = |M|^{-1} \cdot \sum_{P \in M} Dist(P,M-\{P\})$. *M* is initialized with solutions randomly generated. Let *P* be a solution found by tabu search at the end of an iteration. The key idea is the following: *P* should replace a bad (according to *f*) solution of *M* which poorly contributes to its diversity *Div(M)*. More precisely, let *M'* be the subset of *M* containing the *m'* (parameter) worst solutions of *M*, for which the worst value is f**. Let $P^{(div)}$ be the solution of *M'* minimizing $Dist(P',M-\{P'\})$. Then, if $f(P) > f^{**}$, *M* is not updated. Otherwise, *P* replaces $P^{(div)}$. The resulting metaheuristic is summarized in Algorithm 2, relying on neighborhoods N_1 (modify *P*) and N_2 (modify *S*). The returned solution is *(P*,S*)* with an actual cost of *F**, which is the best solution visited in all the considered solution spaces.

Algorithm 2: General approach for (P)

Initialization: set $F^* = \infty$ and $N = UB(N)$.

While $N \geq LB(N)$, do

- generate an initial solution *P* with *N* orders as equi-spaced as possible;
- apply $TS_f(P,S)$ or $TS_f^M(P,S)$, and let $M = \{P^{(1)}, \ldots, P^{(m)}\}$ be the resulting set of local optima according to *f* (*m* = 1 if $TS_f(P,S)$ is used);
- for $i = 1$ to *m*, do: apply *DLS(S)* on $(P^{(i)},S^{(i)})$;
- set $(P,S) = arg \min_{i \in \{1,\ldots,m\}} F(P^{(i)},S^{(i)})$;
- if $F(P,S) < F^*$, set $(P^*,S^*) = (P,S)$, and $F^* = F(P,S)$;
- reduce *N* by one unit;

4.3. Results

The experiments were performed on a PC Pentium 4 (1.6 GHz/1 Go RAM). The parameters *Iter*, *m* and *m'* were respectively set to 1000, 10, 3. As the method has to plan the orders for a whole year, the computing time is not an issue (but an hour of computation is never exceeded). Each instance is characterized by its cost parameters (the fixed setup cost *A* per order, the inventory cost *h* per unit per period, the shortage cost *B* per missing unit). For each period *t* is known the minimum (resp. most likely and maximum) lead time a_t (resp. m_t and b_t). From these three values, discrete triangular distributions can be easily constructed. Two types T_1 and T_2 of instances were generated according to two sets of lead time distributions, with 24 instances per type (which differ according to *A*, *h* and *B*). Set T_1 is based on realistic data from the sawmill context, and is characterized by $a_t \in \{2, 5\}$, $m_t \in \{3, 7\}$ and $b_t \in \{6, 13\}$. Set T_2, which represents a form of sensitivity analysis (the variation of the lead times is larger), is characterized by $a_t \in \{1, 8\}$, $m_t \in \{2, 10\}$ and $b_t \in \{5, 16\}$. In Table 3 is provided a summary of the average percentage improvements (over a basic constructive heuristic based on an EOQ analysis) provided by the general presented approach relying on *DLS(P)* (where a descent local search is performed at step (S2) instead of tabu search), $TS_f(P,S)$ and $TS_f^M(P,S)$, respectively. The results are shown for three levels of *B* and for the two sets T_1 and T_2. Unsurprisingly, the potential benefit of the three methods augments as the seasonality is increased. One can observe that $TS_f^M(P,S)$ outperforms $TS_f(P,S)$, and both methods are better than *DLS(P)*.

Table 3. Compact comparative results

	Set T_1			Set T_2		
Method	Small *B*	Average *B*	Large *B*	Small *B*	Average *B*	Large *B*
$DLS_f(P,S)$	1.39	1.52	1.61	3.75	3.58	3.47
$TS_f(P,S)$	1.72	1.82	2.01	4.15	4.05	3.74
$TS_f^M(P,S)$	1.82	1.86	2.16	4.18	4.06	3.79

5. MNTS FOR DIMENSIONING ASSEMBLY LINES

In this section, a tabu search based on various moves with different amplitudes is first presented, and then adapted to the dimensioning of assembly lines.

5.1. Tabu search within a simulation context

Let $X = (X^1, X^2, \ldots, X^u)$ be a solution of problem (P) which consists in maximizing an objective function *f*. Each X^i is a vector of size *s(i)* and can be denoted $X^i = (x^i_1, x^i_2, \ldots, x^i_{s(i)})$, where the x^i_j's are real number. The following limitation constraint has to be satisfied for each *i*: $\sum_j x^i_j = c^i$. As random events can occur, it is assumed that *f* can only be evaluated with a simulation tool. In such a context, within a local search framework, it is straightforward to define a move in three steps:

(A) select a decision variable type *i*;

(B) augment (resp. reduce) an x^i_k by an amount of *w*;

(C) reduce (resp. augment) some other x^i_j's (with $j \neq k$) by a total amount of *w* (in order to satisfy the limitation constraint).

Within a tabu search framework, if a decision variable x^i_k is augmented (resp. reduced), it is then forbidden to reduce (resp. augment) it during tab^i (parameter) iterations. The three key issues are presented below, and the various neighborhood structures N_1, N_2, … result from these issues.

(I1) Which type of decision variable should be selected in (A)?

(I2) What is the amplitude *w* of the move in (B)?

(I3) How should the solution be adjusted in (C)?

According to issue (I1), *u* types of phase are used in the solution method: each phase of type *i* works on X^i without modifying the other X^l's ($l \neq i$). Each phase of type *i* can be performed during l^i_{max} (parameter) uses of the simulator. Working with phases (i.e., on one decision variable type at a time) allows to having a better control on the search.

To tackle issue (I2), and in contrast with classical tabu search approaches, the move amplitude *w* is dynamically updated during each phase of the search, within interval $[w^i_{min}, w^i_{max}]$ (parameters). Each phase starts with $w = w^i_{max}$, and anytime l^i (parameter) iterations without improvement of the best encountered solution *X** have been performed, *w* is reduced by δ^i (parameter), but never under w^i_{min}. If a move leads to a solution better than *X**, the process restarts with $w = w^i_{max}$. This strategy allows to progressively focus on a promising region of the solution space.

Issue (I3) depends on the two other issues: if x^i_k has been selected for a variation of *w*, the search process should focus on that decision and not modify as much the other decision variables (of the same type) in order to adjust the solution with respect to the associated constraint c^i. Thus, if x^i_k was augmented (resp. reduced) by *w*, the process should then equally reduce (resp. augment) the *s(i)* − 1 other variables (of the same type) by a total amount of *w*, which means that each decision variable is in average reduced (resp. augmented) by *[s(i)−1]/w*.

The resulting tabu search method is summarized in Algorithm 3, which returns the best encountered solution

X^* with value f^*. At each iteration, the neighbor solution can be the best among a set of N (parameter) candidate neighbor solutions.

Algorithm 3: Tabu search with various amplitudes

Initialization

- generate an initial solution $X = (X^1, X^2, \dots, X^u)$;
- initialize the best encountered solution: set $X^* = X$ and $f^* = f(X)$;
- set $i = 1$ and $w = w^i_{max}$;

While the involved simulation software has not been used Q (parameter) times, do

- generate a non-tabu neighbor solution X_i' of X_i by modifying a variable x^i_k of X_i by w;
- update the current solution: set $X_i = X_i'$;
- update the move amplitude w:

(a) if l^i iterations without improving X^* have been performed, set $w = w - \delta^i$;

(b) if $w < w^i_{min}$, set $w = w^i_{min}$;

(c) if $f(X) > f^*$, set $w = w^i_{max}$;

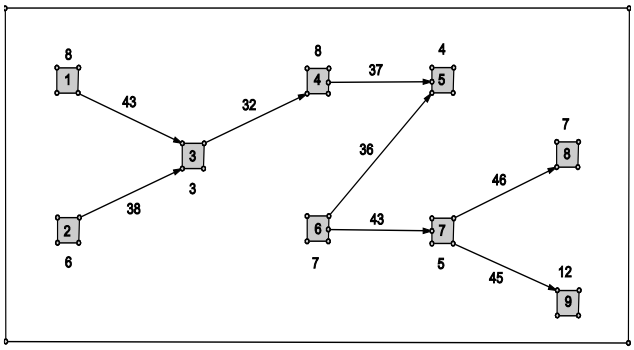
- update the best encountered solution: if $f(X) > f^*$, set $X^* = X$ and $f^* = f(X)$;
- update the tabu tenures: it is forbidden to modify x^i_k in the reverse way for tab^i iterations;
- next phase: if l^i_{max} runs of the simulator were performed, set $i = (i \bmod u) + 1$ and $w = w^i_{max}$;

5.2. Application to the dimensioning of assembly lines

The above tabu search is relevant for dimensioning assembly/disassembly production systems. By dimensioning, one can refer to maximizing the production rate of a machine without successors, with respect to limited resources (e.g., buffer capacity between the machines, total cycle time of the machines). Papers in the field are (Dolgui et al., 2007; Shi & Gershwin, 2009). As random failures might occur on the machines, the software *Arena* is appropriate to evaluate a solution.

Consider a production system with m machines and n buffer zones, modeled by a graph $G = (V,A)$ with vertex set V and arc set A. Vertex v represents machine v and there is an arc (v, v') from v to v' if a piece processed on machine v has then to be processed on machine v'. Moreover, each arc (v, v') also represents a *buffer* (i.e., a limited zone where are stored the pieces between the associated machines). Two types of decision variables (i.e., resource types) are considered: the designed cycle time t_v for machine v, and the buffer capacity $b_{vv'}$ allocated to arc (v, v'). In Figure 4, a solution for a production network. The cycle time associated with machine 1 is $t_1 = 8$, and the buffer capacity between machines 1 and 3 is $b_{13} = 43$. The considered limitations are 60 for the total cycle time (i.e., $\sum_{v \in V} t_v = 60$) and 320 for the buffer capacity (i.e, $\sum_{(v,v') \in A} b_{vv'} = 320$).

Figure 4. Graph representation of a production system with $m = 9$ and $n = 8$



The above presented MNTS approach showed a very good performance on such a production system (Zufferey & Cheikhrouhou, 2012). Indeed, it was tested on the production network associated with Figure 4, for which each machine has its own role: machines 1, 2, 4, 8 and 9 are classical processing machines, machines 3 and 5 are assembling machines, and machines 6 and 7 are disassembling machines. The objective consists in maximizing the production rate of machine 5. The breakdown probability is 5% (associated with each time step) and its length is generated with a uniform distribution in interval [100, 800]. MNTS was compared with a descent local search DLS (the same algorithm as MNTS, but without considering tabu tenures), and a classical tabu search TS for which at each iteration, a move consists in augmenting/reducing any decision variable by any possible amount (followed by the adjustment of the other variables of the same type in order to meet the upper bounds). In TS, a sample of all possible amplitudes is considered at each iteration to modify the decision variable. A pool of 50 initial solutions were generated, which have an average production rate of 1.31 (pieces/minute). DLS was able to reach an average production rate of 1.39, TS obtained 1.37, and MNTS reached 1.41. It was also observed that the quality of the resulting solution negligibly depends on the initial solution, which indicates that MNTS is a robust approach.

6. CONCLUSIONS

In contrast with most of the existing literature on tabu search where only a single type of move is used at each iteration, this paper proposes MNTS (*Multiple Neighborhoods in a Tabu Search*). With a unified terminology, the success of some existing solutions methods is presented, which can

be considered as belonging to the MNTS methodology. Problems in four domains are successively discussed: truck loading, job scheduling, inventory management, and assembly line dimensioning. It is important to mention that MNTS approaches were also successfully adapted in other fields (e.g., (Hertz et al., 2009; Hertz et al., 2005; Schindl & Zufferey, 2013).

The performance of a metaheuristic can be evaluated according to several criteria (Zufferey, 2012b): (1) *quality*: value of the obtained results; (2) *speed*: time needed to get good results; (3) *robustness*: sensitivity to variations in problem characteristics and data quality; (4) *ease of adaptation*: the ability to organize the method so that it can appropriately apply to different specific classes of problems; (5) *ability to take advantage of problem structure* (considering that efficiency often depends on making effective use of properties that differentiate a given class of problems from other classes). MNTS has a good behavior according to these criteria. Indeed, the following ingredients make it possible: (1) the best non-tabu move is performed at each iteration, which contributes to quality; (2) speed is mainly allowed by the incremental computation used to compute the value of any neighbor solution; (3) the use of various neighborhood structures enhances the robustness as well as the quality; (4) only one solution is handled during the search, which makes the method fairly easy to adapt and quick; (5) a dedicated (in contrast with generic) solution encoding allows to accounting for the structure of the problem, and it also contributes to quality.

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26. Thevenin, S., Zufferey, N., & Widmer, M. (2012.) Tabu search to minimize regular objective functions for a single machine scheduling problem with rejected jobs, setups and time windows. In: Proceedings of the 9th International Conference on Modeling, Optimization & Simulation (MOSIM 2012).
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THE FINANCIAL INCENTIVES MANAGEMENT INCLINED TOWARDS ENTREPRENEURS AND ITS APPEARANCE ON E.U. COUNTRIES AND TURKEY

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ABSTRACT

The financial incentives aimed at both the fiscal balances and increasing productivity, which are primary objectives by developing countries. This fact has an important systematic role as a systematic plan including the innovation strategies. All over the world, governments should be making financial development programs to the future while they keep the aimed fiscal balances and fiscal incentives in the related other macroeconomic facts. Therefore, they need the optimal fiscal management and public incentive programs having to be shaped via public decision-making, which aim to increase the market productivity level and entrepreneurships' catching the fiscal resources. In addition, developing countries, like Turkey, need taking lessons from EU countries because of their developed financial management and profitable growth, which is only occurred by means of the suitable fiscal allocation in the productivity market. Hence, the innovation strategies related to financial incentives in the scope of financial management have to being constructed by public decision makers oriented toward entrepreneurs. These structural approaches assist in GDP by the way of investments and market dynamics. On the other hand, the financial applications can inhibit some the aimed utility of financial incentives, but the national tax structure and tax applications would not be suitable and congenial in the current fiscal events. However, the public financial management that is carried on by public fiscal approach must be revised and regulated aimed at entrepreneurships and national investments. This means that financial incentives decisions have to be considered by financial market dynamics together with in the production and market entrepreneurs. It is appear that this approach results in fiscal enabling factors, which regard the fiscal knowledge capabilities in the innovation-cycle management.

KEY WORDS: financial incentives, fiscal balances, fiscal knowledge, innovation-cycle management.

1. INTRODUCTION

The financial incentives that aim to develop the sectorial investments in the suitable manner entrepreneurs' decisions have an important role in the economic growth process and this fact need to improve throughout the financial applications' structural location related to public fiscal management process. The financial application plans that go into effects have to comprise benchmarking process consulting practical process oriented towards the long-term. There are structural questions which has been inevitably deal with in the financial applications process required because of the many studies have explored the effect of varying levels of incentive in many different tasks.

Undoubtedly, in the same process, these analyzes of structural about financial incentives are very important both the impact of trend and the course of financial inventions that are effected by public decision-making process drawing up the attention of probably business innovations throughout the extensive markets and sectoral dynamics[1]. The financial practices' roadmap that integrate publican law that regulate markets and business fiscal conditions shapes these tributary trends and process, which mean that the market interventions are supported via the publically financial supports. We know well that the entrepreneurs assume to reach the expected utility of their investments via the aimed maximum profits within respect to the financial market dynamics together with the currency public

[1] Salvador Barrios Cobos, Holger Görg and Eric Strobl (2002), Multinationals' Locations Choice, Agglomerations Economies and Public Intensives, **ECONSTOR,** Working Paper-Internationalization of Economic Policy Research Paper: 2002\33, Leibniz: Leverhulme Centre for Research on Globalization and Economic Policy and Leibniz Information Centre of Economics, 2002\33, p. 3.

financial politics, which should be taken into consideration macroeconomic balances in the same period.

In addition, the entrepreneurs have financial management and applications that are controlled by market dynamics and these components are usually manipulated by entrepreneurs' practice operations in the market relationships. The structural market relationships' have to be selected, as a relating with theirs budgets constraints, by the entrepreneurs aiming to rise to the occasions[2]. In the point, sometime the market structure covering the financial market risks directed towards entrepreneurs can be in the opposite of liberal politic approaches or this phenomenon needs to public interventions aiming to regulate the structure of investment dynamics to bring into macro balance. In the other hand, the matter that must be required is how it can be management in a suitable manner, which creates the optimal market value on a sustainable basis and dynamic balances[3]. Therefore, the entrepreneurs have to consider some important points in contact with public financial management including financial incentives in term of public applications. Certainly, these mutual approachable relations have some important futures pertaining to ensure the financial dynamics in order to maintain the desired effects of financial incentives inclined towards entrepreneurs that plan for the investments in the complex market relationships.

Many developing countries simply do not possess the resources to make these kinds of investments and the importance of innovations capability for investment decisions depend on the largely location in public financial incentives[4] as the divided financial values. Therefore, some the prime costs for assessment of investment risks can bring up sectoral awareness programs and policy coordination to improve understanding of sustainable investing throughout financial decision making process in term of entrepreneurs in order to establish the optimal investments conditions[5]. So, the probable innovations or sectoral investments dynamics to the future have to be considered together with the oriented financial valuation assisting GDP's augmentations meaning all the publically incentives must be taken up the additive criteria giving financial values to GDP[6]. The effective financial instruments for the investments' management need to support via public decisions and interventions because of the market failures generally can be maintained by public regulations in the wrong financial approaches that which fact gives responsibility of financial obligations[7].

In addition, investors and entrepreneurs need to more understand the level of financial management effects considered in the scope of public financial supports connecting with the macroeconomics objectives[8]. Therefore, sectoral development agencies including private investment dynamics have to being regulated in the common knowledge as a systematic management[9]. This described financial fact should bring up the potential improvements' level throughout the financial management inclined towards the desired investments in contact with the market opportunity. Promoting external funding via publically financial supports the portfolio investments should be aligned with sustainable financing strategies to supplement local and regional funds for sectoral developments by financial incentive decisions. In this respect, the public financial intensives have an important role in the being talked of sectoral development process due to the financial supports and incentives reduce entrepreneurs' investment risk as the basic principle of priority factorial costs coordinating to improve understanding of sustainable investing[10].

As Turkey developing countries that aim joining to EU in their own progression, know that national investments are not enough aimed at both economic growth and integrations process. Developing countries must deal with international capital movements' advantages by way of financial regulations' positive effects. In the other hand, these being talked of countries should come to terms with the other important structure alterations appeared in their national fiscal process. Therefore, developing countries have to be considered together with theirs different fiscal futures comparing with the other members of EU countries' financial structures. Namely, their financial incentives limits inclined towards entrepreneurs have to be debated in the normative financial formation comparing with the developed countries in EU framework[11].

2. THE SYSTEMATIC STRUCTURE OF FINANCIAL INCENTIVES IN TOUCH WITH INVESTMENTS AND ENTREPRENEURS

We know that the classic due diligence via financial tools and financial actors interested in funding can highly assess inclined toward SMEs[12], which based on the past performance and level of assist in GDP. But, the main problem is that their can not properly determine an SME's innovation capability related to financial incentives due to legal relating to law publically regulations' lacks. Hence, the

[2] Hideki Nishigaki (2008), "Are The Fiscal Policies and monetary Policies of The G-7 Countries Effective in Decreasing The U.S. Trade Deficits", **Econıomics Bulletin**, Vol. 6, No: 27, (July 2008), p. 4.

[3] Nishigaki, p. 6.

[4] Europe Innova- Innovation Management, "The Importance of Innovation Management Performance for Financial Investors Decision-Making: Lessons Learned from The Survey of German Investors**"**, **Europe Innova Paper February 2011,** Duesseldorf: European Commission Directorate General Enterprise and Industry-The IMP[3]rove-Europe an Innovation Academy, February 2011, p. 3.

[5] Graham Elliot, Ivana Komunjer and Allan Timmerann (2005), "Esimation and Testing of Forecast Rationality Under Flexible Loss", **Review of Economic Studies**,Vol. 27, No. 2, p. 1114.

[6] Cobos, Görg and Strobl, p. 17.

[7] Europe Innova- Innovation Management, p. 7.

[8] Joseph E. Stiglitz (2000), **Econonomics of The Public Sector**, 3rd Ed., New York: W.W. Norton & Company, p. 780.

[9] Europe Innova- Innovation Management, pp. 3-4.

[10] David Burgstahler, Luzi Hail and Cristan Leuz (2004), "The Importance of Reporting Incentives: Earnings Management in European Private and Public Firms", **Public Institutions Center**, (February 2004), p. 21

[11] Eva Diedrichs, Kai Engel and Kristina Wagner (2006), "Assessment of Current Practices in Innovation Management Consulting Approach and Self-Assessment Tools in Europe to Define The Requirements for Future "Best Practices", **European Innovation Management Landscape Europe Innova Paper No: 2,**, Duesseldorf: European Commission Directorate General Enterprise and Industry-The IMP[3]rove-European Innovation Academy, (November 2006), p. 19.

[12] SMEs = Small and Medium Enterprises

financial incentive structures that are supported by financial actors need to be frequently considered in the scope of innovation management with currently application towards entrepreneurs and investments. In this point, certainly the normative structure of financial regulations depends on the publically sanctions that are suggested by making the right investment decisions taking into considerations the public polls, sectoral purposes and publically choices to the future[13].

First of all, the systematic structure financial incentives is well-adjusted and taken by public decisions in the under business conditions and the management approaches that make a change have to be involved in the line business strategies[14]. In the other hand, EU countries' politic cultures and involving market evaluation process are the main characteristics, which designate the institutionally financial relations related towards financial incentives management connected with entrepreneurs. The improvement of enabling factors giving a business-investment opportunity is directly committed to the financial management performance and control including the transparency of financial incentives' application in touch with financial resources' allocation[15]. In the other hand, these improve level express the national innovation capability aimed at both public and private sectors in order to divide up among themselves. The financial incentives being founded on the national saving and tax income in the current period including overall political stability with the degree to which rule of law is respected and enforced by the financial laws and regulations that impact access to capital and credit aimed at the improvement of entrepreneurs. The systematic structure of innovation in the financial framework can separate in appearance fundamental five points in each other as follow[16]:

Figure 1. Innovation Circular Process Aimed at Financial Management and Financial Reasonable Approaches

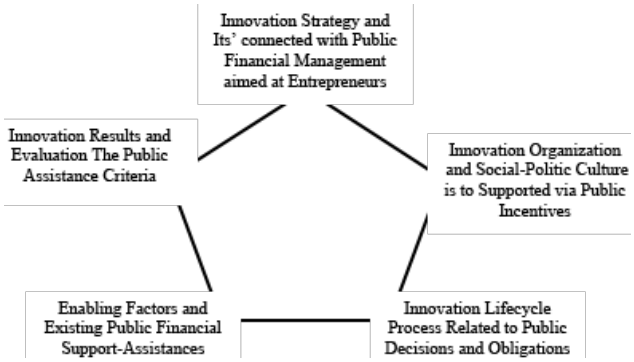

Figure 1 express the important circular circumstances in the deductive reasoning points directly aimed at the financial management process connected with investments from public incentives to entrepreneurs. This means that an effective response to meaningful capital formation that require also regulatory financial interventions covers the financial process improving the capacity of banks together with the other financial institutions[17] as well. And undoubtedly, the principal objectives aimed tightening regulatory financial flush to the investment markets have the limited credit reserves in the application process including thorough more less risk and financial cost[18]. Hence, the financial management unit, as seen on the figure 1, that inevitably connects with in the circular flexibility is in the linear adjustment both institutional and financial applicable dynamics.

3. THE IMPACTS OF STRUCTURALLY APPROACHES IMPROVING THE ASSOCIATED FINANCIAL UNITS OF PUBLICALLY FUNDS

We know that the publicly savings funds have an effectively locations using for entrepreneurs in the market investments, which must be considered directed towards market dynamics including the other financial resources. In addition, indeed the optimal financial distributions inclined towards entrepreneurs need the fiscal transparency having their locations and effects in financial application observing process controlling too[19]. Especially, the desired income and productivity levels covering small and medium enterprises have effectively a determinative structure for taking encouragement credits and financial incentives because of their systematic and methodological approaches reveal the different results sometimes[20].

Furthermore, it is not possible to find common management values that determine all the countries' approve the standardized financial rules in in the scope of circular application reasoning[21]. The methodological structurally approaches of investment management related to economic performance and entrepreneurs who favor changes at the basic investments ground directed toward the future include some the main developing points considered by public financial supports and the other public regulations in contact with the improving process. The methodological approach points possible to order as follow[22]:

[13] Laura Albereda, Josep M. Lozano and Tamyko Ysa (2007), "Public Polices on Corporate Social Responcibility: The Role of Governments in Europe, **Journal of Business Ethics,** Vol. 74, (Springer 2007), p. 92.

[14] Europe Innova- Innovation Management, **The Importance of Innovation Management Performance for Financial Investors Decision-Making,** p. 4-5.

[15] Yoshihiro Toyoma, "Privatization of Public Enterprises and It's Problems in Japan", **International of Social Economics,** Vol. 25, No: 2-4, (1998), pp. 391-392.

[16] Europe Innova- Innovation Management, **The Importance of Innovation Management Performance for Financial Investors Decision-Making,** p. 8.

[17] The World Bank, **Turkey Country Economic Memorandum: Sustaining High Growth: Selected Issues**, Vol. II-Expanding Report, Report No: 39194, (April 2008), p. 31.

[18] Tanzi, Vito, "Financial Markets and Public Finance in Transformation Process", in **Transition to Market: Studies in Fiscal Reform,** Vito Tanzi (ed.),Washington D.C.: International Monetary Fund, (1993), pp. 13-14.

[19] Colin F. Camerer and Robin M. Hogarth (1999), **The Effects of Financial Incentives in Experiments: a Review and Capital-Labor-Production Framework,** Division of The Humanities and Social Science-Social Science Working Paper No: 1059, Pasadena: California Institute of Technology 1999, p. 7.

[20] Camerer and Hogarth, p. 20

[21] J. Michael Steele (2001), **Stochastic Calculus and Financial Applications, Stochastic Modelling and Applied Probability,** New York: Springer-Verlag, 2001, pp. 258-259.

[22] Kai Engel, Eva Diedrichs and Sabine Brunswicker et al. (2010), **Imp³rove: A European Project with Impact: 50 Success Stories on Innovation Management,** European Commission: Enterprise and Industry, Europe INNOVA Paper No: 14, Luxemburg: European Union European Commission, Luxemburg 2010, p. 23.

Figure 2. The Interactions and Responsibilities in The Innovations' Methodological Approach Aimed at Entrepreneurs

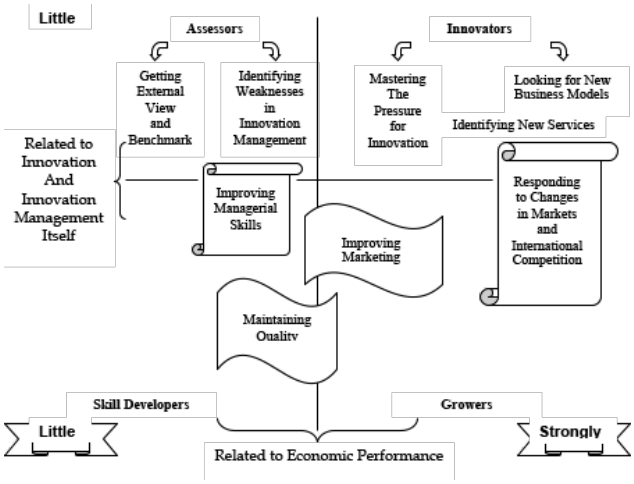

Figure 2, bring up the relationships of the investment management process including their favors change in the innovatively investments that probably result in the different impacts with their own dynamics connecting with public financial incentives turned towards firms and entrepreneurs. In this framework, the financial incentives management with its' own strongly and remarkable impacts have to bring into the investment process as both the structural innovatively dynamics related to economic performance and the publically incentive dynamics for innovatively investments that are supported via publically financial decisions to the probably financial balance options in the future taking into considerations the effects on the public budget balances connected with the currently macroeconomic balances[23]. Because, the resources of public financial incentives are the national saving, the commercial banks and the other public incomes, and all the recentness investments' dynamics considered in the basic economic relations require an optimal resources allocation[24] in order to obtain the entrepreneurs' who favors meaningfully change investment options.

To improve the financial managerial skills especially for public financial regulations connected with public decision-making are directly affected by public decision dynamics responding to changes in the investment markets for entrepreneurs, and the fact come to mean that this is typically conducted by on-site inspections of potentially competitive projects within entrepreneurs. In addition, this national and international competitive capital operations need to establish the innovation business models via the methodological approach[25]. Hence, the systematic-methodological structurally formations are almost in the unsuccessfully investment efforts for entrepreneurs if there are not enough limits that are ensured by directly public financial incentives required maintaining the meaningful financial quantity via the financial resources straightly dividing among themselves. Indeed, the most of EU countries have the methodological incentive applications to the investment market dynamics or market forming, and there are important structural reasons of this financial operationally fact as both the countries' strongly financial infrastructure and the desired highly levels of national savings[26].

4. THE STRATEGICALLY APPEARANCE OF FINANCIAL INCENTIVES ON EU COUNTRIES AND THE STRUCTURALLY FUTURES OF FINANCIAL MANAGEMENT

The financial management strategy aimed at investors and entrepreneurs with the priority objectives in the scope of productive manufacturing industrial structure have the resemblance characteristic peculiarity of the financial incentives in EU countries including the structural futures. These financial appearances on EU countries express to support related to the identification of innovation management performance within both the change needed of productive sectoral formation to the future and the harmony of the associated financial movement in them selves. In the other hand, also this fact means that the financial incentives' sustainability effects on the stabilized future of EU countries directed towards the desired financial support via largely publically incentives and the suitable allocation of financial incentive resources[27].

4.1. The Legislative Background Of Incentives In European Commission

The associated market formatting is the priority objective aimed for all EU countries and European Commission is concerned about the important financial obligations directed towards the member countries. The financial intensives measurement is the one of the matters related financial intensives in European Commission's relationship in touch with the other member countries of EU[28]. And then the last assemble related to financial incentives was held on 21th September 2010 in order to the other aimed fiscal regulations and especially the environmental pollution reducing was purposed due to the business operations resulted in an important financial costs. Certainly, there are the decisions related to the fiscal

[23] Mark Leonard and Jan Zielonka (2012), **A Europe of Incentives: How to Regain The Trust of Citizens and Markets**, London: European Council on Foreign Relations, (June 2012), p. 17.

[24] Leonard and Zeilonka, p. 25.

[25] Hugh T. Patrick "Financial Development and Economic Growth in Developing Countries", in **Money and Monetary Policy in Less Developed Countries: A Survey of Issues and Evidence,** Warren L. Coate, Jr. and Deena R. Khatkhate (eds.), Oxford: Pergamon Press, 1980, p 49.

[26] Vittorio Corbo and Klaus Schmidt-Hebbel, **Public Policies and Saving in Developing Countries,** The World Bank Country Economics Department, Working Papers-WPS 574, 1991, p. 25. .

[27] Corbo and Klaus Schmidt-Hebbel, pp. 46.48.

[28] European Commission (EC) (2013), **Guidelines on Financial Incentives for Clean and Energy Efficient Vehicles,** Commission Staff Working Document, Brussels: 28.02.2013 SWD (2013) 27 Final, p. 2.

regulations including financial incentives as the ensured decisions in the European Commission decision process including the opinions of European Commission's member. However, these comprehensive approaches have taken care of this more meaningful financial constituting, which have increased the financial incentives' effects, than the previous existed incentives regulations[29].

Hence, the European Commission gathering about the communication of the member countries in the scope of the review fiscal adjustment have recognized the demanded fiscal incentives including largely the public financial incentives in 2010 and the intended obligations ensuring the incentives' effects at the internal market of EU. In the other hand, the defectively financial coordination's negative effectives have to be exceeding for preventing the distortion of EU's internal markets, and then the commission's functionally expressions result in the European Council and European Parliament declared in order to put up with the financial intensives' guidelines. Furthermore, the taken obligations on the process were determined by European Council carrying out the special seminar, which was hold on 21th September 2010 and the member countries' financial experiences covering financial incentives that were accepted for enabling the identification of best practicing[30]. In this period, also the financial incentives came to mean an important the financial policy measures as the inevitable publically polices, which have been suited via the requirements of the regularly development funding for investment encouraging and entrepreneurs' innovation opinions aimed at the productive manufactured goods and sectoral services like transporting in the more sensitive and responsibility environmental conditions[31]. It is appeared that European Commission' responsible financial policies for developing EU's internal markets and services supported by public financial subsidies in the points of E.Us' view. And then the other fact connecting with financial incentive regulations holding on 21th September 2010 was hold at the 6 June 2012 for bring up the final report adopted in the other financial incentives regulations in the framework of these finally decisions to today's.

4.2. The Obligatory Principles of Financial Incentives Taken on The Member Countries in EU

In this approaches of financial incentives, also it is an important point interested in the management of financial incentives accepted by all the member countries is to become the familiar with basic investment concepts and learn about institutions actively providing access to capital for sustainable investment projects directed towards financial incentive applications. In addition, this structure fact has a legislation power on these EU's member countries and this adjustment process has the some inevitable characteristic futures with important criteria concerned in the financial incentives management of EU in order to achieve the productive and suitable incentives applications' ground as follow:

- First of all, the financial incentives' management have to be regulated and shaped in the European Commission directives' framework, which bring up Directive 98/34/EC including the other technical regulation (Article 1 of Directive 98/34/EC[32]). It means that this interrogate and cross-examine EU's the associated financial strategy together with the different and alternative approach, which is under debate in the last period.

- Financial incentives must be distributed according to the effects of special incentives recommended by decision making to apply step by step and each of the application. The held structural formations have to be considered directed towards to transparency in the spite of financial incentives' different effects (Article 8/1 of Directive 92/59/EEC[33]; Article 8/1 and Article 9 of Directive 98/34/EC). So, the proportionally financial incentives dividing among themselves are meaningful as an inevitable application and obligations' totality.

- Therefore, sometimes the super credit applications can be supported, as public subsidies concerned within EU's countries not found very strange. The solution of this phenomenon is not to be against EU's the financial objects (Article 6/2 of Directive 98/34/EC).

- All the financial adjustments in the framework of EU' member countries need to technological neutrality that can provide the financial inspection analyzes approved of the held in common acceptance by all the member countries. Therefore, the technological wholeness must bring up an inevitable associational identity provision in order to ensure that nothing goes wrong to the meaningful and suitable results (Article 7 and Article 9 of Directive 98/34/EC) .

- Certainly, the extent and size of financial incentives take plane with different effects in the financial process because of the member countries have the different levels of economic growth and this phenomenon results in the declined financial standardization in themselves. In the other hand, the size and contain of incentives may bring forth some risks on the production process and especially, manufacturing sector that need the financial subsidies aimed at the other probably risk factors and sectoral balances. Hence, the financial extent has to express together with the associated financial regulations in order to reduce the probably risk factors and market failures by fair means (Article 9 of Directive 98/34/EC).

[29] Kevin T. Davis,and Mervyn K. Lewis, "Deregulation and Monetary Policy", in **Current Issues in Financial and Monetary Economics,** Kewin Dowd and Mervyn K. Lewis (eds.), New York: St. Martin's Press, 1992, pp. 131- 133.

[30] European Commission (EC) (2013), **Guidelines on Financial Incentives for Clean and Energy Efficient Vehicles,** p. 3.

[31] Ibid.

[32] European Council (EC), **Directive 98/34/EC** of The European Parliament and Of The Council of 22 June 1998 on The Laying Down a Procedure For The Provision of Information in The Field of Technical Standards and Regulations.

[33] European Economic Council (EEC), Directive 92/59/EEC at 29 June 1992 Directed Towards General Product Safety, Regulate: OJ L 228, 11.8.1992, p. 24.

- The legislation power of EU related to incentives regulations would be into the positive effects and progressions, and then the relevant EU legislation would be put forth the clearly recommended standards (Article 1/4 of Directive 98/34/EC)[34]. But the held in common regulations, as aimed at the financial structure and applications, are involved in the meaningfully place of decision making process inclined towards the optimal financial factors, fiscal adjustment balances or etc., in order to have not harmful effect on the member counties in EU (Article 10/4 of Regulation
- (EEC) No. 793/93[35]. In the case of an existing substance or in Article 3/2 of Directive 67/548/EEC[36] in the case of a new substance).

These general financial criteria have to be taken on as important printed notices that get financial incentives in shape for the candidate countries' completely new financial structures like Turkey.

5. THE APPEARANCE OF FINANCIAL INCENTIVES MANAGEMENT ON TURKEY AND ITS' SOME IMPORTANT POINTS

Turkey is not the perfectly member of EU because of Its' financial conditions are not enough and respond to the perfectly member conditions, and which mean that Turkey should achieve the based financial incentives throughout Its' financial adaptation process within financial fragility. In this point, the matter is that the productive firms -or companies- have the different approaches how to maintain and exceed the growth targets of entrepreneurs including a rough estimate of costs and potential income for the community. However, a wide variety of organizations, including government agencies, industry trade associations and research firms regularly need to financial analyses that are provided by research evaluation techniques, which are supported via the publically financial incentives in both general and specialized enterprises.

And also, these arguments' ground brings up the financial risk management considered, and furthermore, the structural phenomenon contains the effects of inevitable public decision making with the financial management arguments in Turkey. This undesired formation have continuing since a long time in order to deal with the negative structural aimed at bring to a successful conclusion. In other words, the adaptation process inclined towards being the completely member to EU make inevitable the financial regulations via the changed legislations and alterations considered in decision making in this framework. The financial criteria that are in lieu of law to the member countries in the scope of EU[37], as a phenomenon, can be the cause of undesired structural financial options for both financial-structural objectives arriving at the level of international standards and all the associated international trade operations in Turkey.

5.1. The Financial Incentives' Appearance on The Currently Financial Structure

In Turkey, it is apparent that the financial incentives especially are shaped via the Turkish Tax System that contain the applicative components, which have been considered in the tax operations like the other majority countries all over the world. Hence, the regulations related to the national tax structure have been the most important financial options directed towards the expression of financial alterations including the national financial incentives too.

This currently financial situation and its' location connecting with the tax operations in Turkey can attempt to bring up watching on the figure (3) in the circumstances framework to Turkey, as follow[38]:

Figure 3. Financial Incentives System's Appearance and Its' Systematical Distribution of Financial Management in Turkey

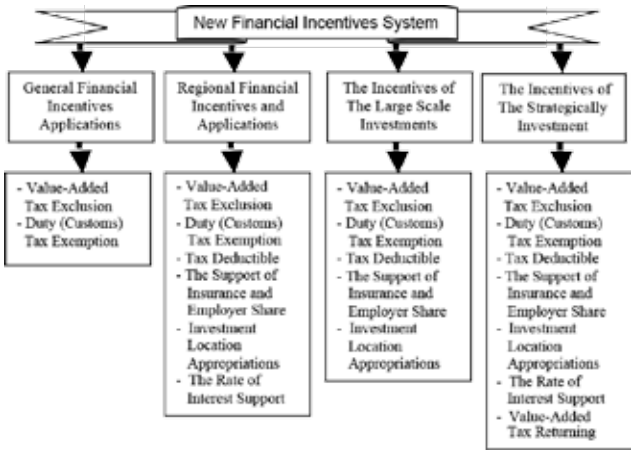

Figure 3 express the fundamental appearance of Turkish financial incentives considered in the distributive financial management within the incentive items have been in the financial friendship shaped by the indirect taxes including regional incentives for a long time. But, indeed the practically important incentive applications with their remarkable effects are in the extent of the direct

[34] European Council (EC), **Directive 98/34/EC**, p. 4.

[35] European Economic Council (EEC), Regulation made by Council (EEC) in The Regulated Framework No. 23 793/93 of 23 March 1993 as a The Evaluation and Control of The Risks of Existing Substances, Regulation: OJ L 84, 5.4.1993, p. 1.

[36] European Economic Council (EEC), Directive Regulated by EEC in The Regulation 67/548 /EEC Framework at 27/June/ 1967 on The approximation of The Laws, Regulations and Administrative Provision in touch with The Labeled Classification of The Intensives Directed Towards Dangerous substances and The Other Manufacturing Operations, Regulation: OJ L 196, 16.8.1967, p. 1. And also, European Economic Council (EEC) The Other Directive considered and regulated as altered by Directive 92/32/ EEC, Regulation: OJ L 154, 5.6.1992, p. 1.

[37] Şimşek, Hayal Ayça ve Ayşe Günay Bekar, "The Effects of Fiscal Policy Rules on Fiscal Balance: The Perspectives on Turkish Economy", **Sosyo Ekonomi**, 2008-2 080256, (Temmuz-Aralık 2008-2), pp. 102-104.

[38] Resmi Gazete, 19 Haziran 2012 tarih ve Sayı: 28328; Lore Danışmanlık, http://lore.com.tr/p_252_yeni-tesvik-paketi_2?gclid=CM3Bro6nmLYCFcRQ3godGxsAHQ (25.03.2013).

tax financial operations being personal income tax and cooperation tax[39] in spite of banks' credits and subventions. The completely adaptation matter occurs in this point and Turkey come face to face the meaningful alterations aimed at the participation process of EU including the reformist tax investigation, which are to being useful for the propose of entrepreneurs within both the effectively tax management and its' financial balances concerned with the new incentive concept.

5.2. What Must Be Done to Achieve The Obligatory Adaptation Dynamics to EU?

This structural question that has debated since a long time, is which there are any the perfectly solution or not for the desired financial adaptation process including the integrations dynamics because of the financial reform process' containing have to be defined and considered via the financial management preferences. Certainly, this ground of arguments includes the financial incentives' applications that express usually the politically process' obligatory dynamics and also this frame put forth Turkey's financial policies for consideration as the some brief objectives inclined towards the provisions view of EU for completely being membership.

- First of all, these financial entirely concept has some the adjustment matters that have to deal with related to financial investments in order to be completely EU's member via the supported entrepreneurs in Turkey. As Turkey the politic process provides not the optimal distribution of financial incentives and the negative phenomenon results in the deviated from the optimal distributive effects in order to achieve an international financial unity at the future.

- The optimal financial framework accepted by all the member countries have to give some answers related to the financial management matters directed towards entrepreneurs in Turkey and EU's financial obligations are obviously stated containing financial incentives strategies[40] for developing countries like Turkey.

- The interrogated priority matters are related to manufacturing companies that are interested in EU's financial decisions. The point of the view EU means that which sectoral enterprises priority supported by public financial resources or what the limits of publically financial supports are directed towards entrepreneurs in the market regulations aiming at the market expectations' financial limits. Usually, the financial regulations have been focus on the provided criteria via the financial analyses due the financial analyzes are at the first sight in the incentives application process of EU.

- The being talked of financial incentives applications have a meaningful important in Turkey as well as EU countries because of these countries' financial strategies and especially these countries have the different money units regarding fiscal policy, a fiscal expansion–an increase in the fiscal deficit–may or may not be depending on the composition of the fiscal incentives. Therefore, especially Turkey's monetary and fiscal application policies must be constituted as an important fiscal contradictions arranging the integration process like all counties' financial obligations appeared in the scope of EU's financial conditions[41].

- The other important matter, as a strategically approach questioned from the point of countries in EU, is the dilemma of how important to the benchmarking of innovation strategies or how much the structural alterations accepted aimed at currently the national financial balances and objectives[42]. Because, these member countries' entrepreneurs and investors connected with sectoral innovations are appraised and supported by public incentives, which are taken shape in the different national own priorities like Turkey.

- The needed manner that have to bring up connected with the appearance on EU in the financial incentives management is the structural financial alterations that are result in the different outcomes and effects. Hence, the financial analyses based on the notion of an economic development principal are the best thought of as a normative framework of EU and the financial analyses determining how different values of an independent variable impacts depend on the variable financial under a given set of assumptions in Turkey. These required conditions state that however Turkey needs to be a financial distinctiveness having on the well-used of financial incentives turned towards entrepreneurs with socially responsible investing for Turkey' member[43].

6. CONCLUSION

The financial incentives are the important phenomenon that must be considered in the compliance process with together with all fiscal background like tax discounts and the other financial exemptions, which should be constructed in the international normative fiscal items forms. This fact prohibits any discrimination throughout internally national taxation in the particular approaches aimed at the sporting the domestic manufacture sector under EC obligations. Moreover, this fact includes the associated adjustment fiscal rules in order to be together with the other EU countries in the same concept. In this respect, the financial incentive management reveals the different special features that appear in the member countries due to these countries' the distinctive and fragility financial structures related to

[39] Ahmet Başpınar, **Tax Law and Turkish Tax Systrem,** Ankara: Republic of Turkey Ministry of Finance Strategy Development Unit, Issue No: 2009\394, 49-50.
[40] World Bank, **Turkey Country Economic Memorandum**, Vol. II,-Expanded Report, Report No: 39194, (April 2008), p. 129.
[41] World Bank, **Turkey Country Economic Memorandum,** pp. 131-132.

their own different management ways. So, the countries' incentive systems and methodological approaches have to be constituted with the assorted effects for both financial management that came on the financial markets due to having different institutionally features and these countries' foreign commercial relationships being in the different financial expected.

In this point, the considered matter pertaining to the financial incentives aimed at entrepreneurs is the classification of financial incentives inclined towards the incentives' contents as well as the entrepreneurs' preferences in the established sectoral developments including their own aims comparing with the different investment costs. In the other hand, the entrepreneurs' investment preferences become a reality bring up a linear correlations for both investments costs and the considered investment plans that are supported via financial incentives. Because, the dominant diagnostic items of financial incentives creature the additive criteria on the desired investment, which bring forth the contributed criterion effect on the economic growth being the conclusion of financial incentive applications. As Turkey, also the financial incentives' structural location is considered in the adjustment process in order to ensure being a membership of EU as an inevitable financial condition in order to ensure to achieve the international associated incentives ground. Therefore, the analyzed adaptation process aimed at the membership of EU provide to access with the proposed financial regulations including the basic financial incentives standards in Turkey. This practically approach that is situated in the adaptation process means the accepted mutual recognitions in term of EU countries.

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FACILITY MANAGEMENT AS A MOTIVATOR OF NEW ENTERPRENEURIAL INITIATIVES

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ABSTRACT

The objective of the paper is to present the possibilities of FM as a contribution to value creation for user and as an entrepreneurial opportunity. To achieve value creation processes, it is necessary to have competent actors and good tools for decisions making support. The research contributes to extension of building total life, sustainability, management and entrepreneurship. The methodology and tools are a result of research project and are based on qualitative and quantitative research methods. The research findings are a result of in-depth analysis and present the possibility how to achieve more efficient business by collaboration of different stakeholders and ideas. The methods presented are mainly developed for public and private real estate sector, but the basic principles are general and relevant for other sectors. The paper will introduce better base for Asset Management, Facilities Management and added value from business and user perspectives.

KEY WORDS: value creation, costs, sustainability, users, owners.

1. INTRODUCTION

The real estate situation in several European countries globally exposes the need for changing the business strategies in accordance with the costs of servicing core business and maintaining buildings and users' needs. Better understanding of business dynamics, logistics flows, built environment challenges and opportunities, care for the environment and users' needs enable forecasting of supply and demand for service and products, and should be the key elements of business strategies. By the Facilities Management (FM) European standard EN15221, the activities are divided in two headings, named 'space and infrastructure' and 'people and organization'. The heading 'space and infrastructure' includes among others accommodation, workplace, technical infrastructure and services that provide a comfortable climate, necessary lighting, etc., cleaning, and finally other necessary space and infrastructure. The heading 'people and organization' includes among others health, safety and security; hospitality; ICT; logistics; other support services. FM can cover the whole property area and communicate on strategic, tactical and operational level. Based on the integrated position of FM within the organization and knowledge about space and people, FM can play a key role of service innovation and implementation.

As an interdisciplinary field, it covers different services areas that can support core business services to perform more productive and satisfactory and can create value for them (Bjørberg et all, 2012). It has very strong influence on the satisfaction of the employees and end-users, thus providing facilities and services facilitating or enabling the daily activities. Satisfaction with work is one of research variables, which is important for employee effectiveness and efficiency (McLaughlin et all, 2006, Temeljotov et all, 2015). Effective and efficient supporting services from FM to core business units and clients can enrich the quality of core business and cost efficiency of organizations. Management quality is ensuring that services are delivered in a resource-efficient way (Price et all, 2015). The user involvement is a key indicator for the successful service innovation implementation, so from user's perspective FM role is seen from the possibility to develop and provide the services according to user's needs to achieve service excellence.

By strategic level of FM it is possible to collect, organize, visualize and communicate data as means for strategic planning and budgeting (Listerud et all, 2012). It is found out that FM orientation should be more focused in user's needs and value creation. From value perspective, we have to mention Rokeach (1960), according to the value is a sustainable belief, specific form of behaviour or finite state of existence, which is individually or socially more desired behavioural form from the opposite form of behaviour or finite existence. Rus (1997) sees the property market as a situation, which more than any other emphasizes the instrumental aspect of satisfying needs and action-

based orientations to the property goal, which includes also motivation. From psychological perspective, every environment surrounding 'humanity' has certain features, characteristics that need special attention, simply because they are very important for humans, their life, survival, living, leisure and work (Temeljotov 2005). All of these 'directed' attentions can be evaluated, both in the sense of satisfying their personal needs, as well as economic indicators. Value can be attributed to property at any given moment of it lifecycle: planning, initiation, growth, renewal, decay and demise. Planning and development are important elements of this process, similarly as the past, present and future development of the entire micro- and macro-environment.

In many researches, the changes of value perspectives in Facilities Management through the years were compared (Jensen et al. 2013). In the findings, they state a number of different definitions and focus points on added value of FM, dependent on the academic field and the area of application. The different research perspectives provide, in combination, a holistic view by integration of an external market based view (aimed at output) and the internal resource based view (input from FM and RE). Jensen et al. (2013) put a list of emphasis for added value of FM, including at the beginning the focus on strategic aspect of FM towards the business impacts and effects. However, one of the challenges in FM is to change the focus from 'FM 1.0 (Cost Reductions) to FM 2.0 (Value Creation)' (Boge 2012). A change from FM as a mean for cost reductions to FM as mean for value creation may necessitate increased outsourcing of FM, because outsourcing of FM may facility innovation and increased value creation. But organizations that outsource FM may also face serious obstacles to value creation, such as adverse selection and moral hazard problems (Boge 2012). Jensen et al. (2013) indicated that the success of a collaborative relationship leads to the success of value delivering to the stakeholders. From the concept of 'Value Adding Management', which focuses on the relationships between FM and the core business at strategic, tactical and operational levels they argued that the relationships with the stakeholders should be managed differently at each level.

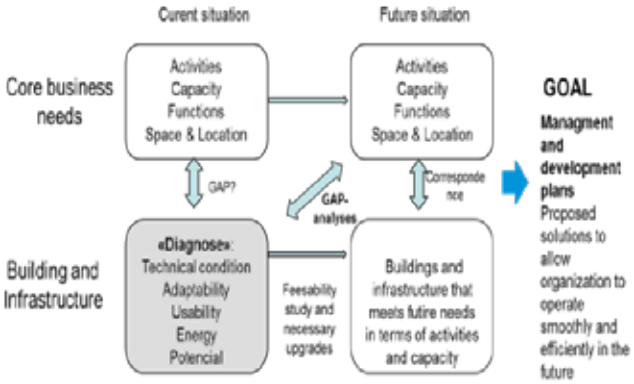
2. METHODOLOGY AND RESEARCH

The supply of business and housing units on the market can be categorized on the way of categorization according to extended care dependency scale, facility management excellence and availability of logistic services. Service innovation and service design are two approaches for further development of Facilities Management and Facility Services to maintain the users' wellbeing. The results could serve as a starting point for development of new tools and methods for development and visualisation of improved FM and new facility services tailored to the users' needs. The research is divided in different phases to follow the long life perspective of keeping value, adaptable for future needs in social and individual way. With a good interactive decision tool, we also want to get long life cycle building/ neighbourhood oriented competent players.

2.1 Different tools

The Nordic SURE (SUstainable Refurbishment) project, Guideline on Sustainable Refurbishment of Buildings, (Almås et al 2013) investigated different methods and tools to assess buildings and building portfolio. According to the basic principles of the project to develop a method with an indication of building development potential, simply collecting data and user friendly: MultiMap, LCA, BREEAM In-Use, SURE, SIA (Sustainable Impact Assessment) and LCC where evaluated. All of these methods and tools have different advantages. But for the purpose assessing building portfolios MultiMap combined with LCC should be considered.

Figure 1. Holistic Analysis Model for strategic development of building portfolios (Larssen, 2011)

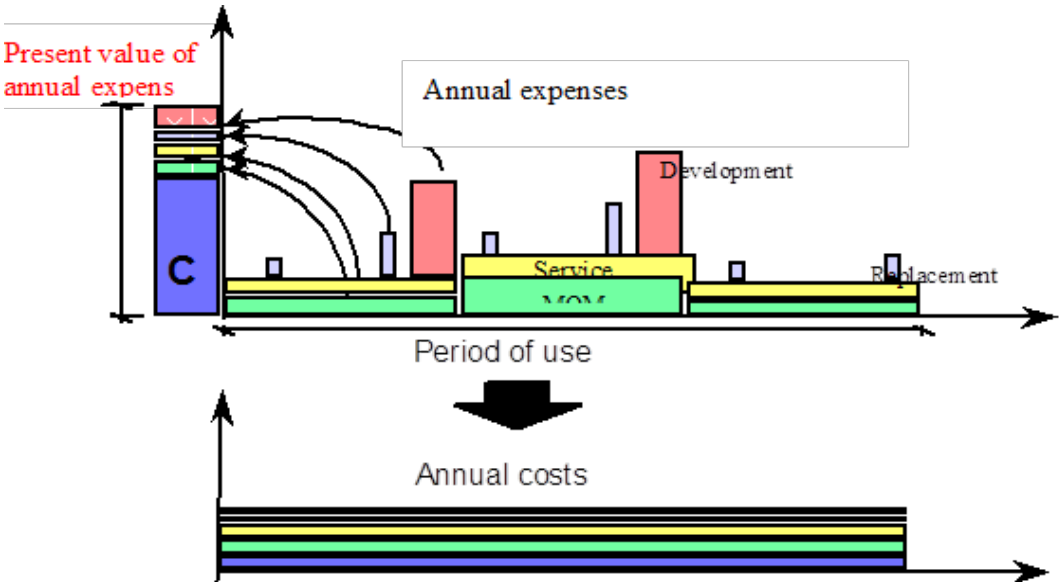


Figur: Multiconsult

MultiMap as a method is based on a holistic approach shown in Fig. 1 to assess the GAP between today status of performance and future needs or demands. The assessment method is based on two main approaches: 1) data input provided by FM-personnel with good knowledge of the actual building portfolio (space and infrastructure) with some assistance from persons with knowledge about core business of the portfolio (people and organisation), 2) assessments of interviews of users of the portfolio (social and environmental aspects including economy). Collecting information for building portfolio gives a lot of data. For communication purpose of all data Onuma Planning System can provides possibility for visualising in 3D pictures.

Basic costs are rent of space, which is a "cost covering rent" based on annuity of net present costs (NPC) seen in a defined period as shown in Fig. 2. Anticipated costs over this period, such as yearly operating costs like energy, household insurance, cleaning, and public dues, and periodic costs like preventive maintenance, replacements and minor upgrading, should be taken down to NPC. NPC put back as an annuity will then be the calculated rent as a minimum to meet the anticipated costs.

Figure 2. Cost distribution over time (Listerud et al. 2012).



Needs are changing with ages and real estate and facilities management have to give answers or to find proper solutions, which should be based on new knowledge from the fields and environmental orientation. The economy model should also include increasing different service costs to develop healthy residential community, from physical and social perspective. An extended FM-model should be developed to cover all services from traditional FM and also to include other services for different groups of community population.

2.2 Research goal

The aim of the research Oscar is to develop knowledge, methods and tools that enable the optimization of the building design. In this way the building can contribute to good value creation for owners and users through its lifetime. The name Oscar is given by Oscar's Wilde statement from the book 'The picture of Dorian Gray': *A fool is a man who knows the price of everything, but value of nothing.*

Four objectives are put to achieve the outcome:

- to obtain the knowledge of needs to be addressed in the early phase to maximize the values for user and owner of building;
- to identify how can existing execution models (planning, construction and commissioning) be used to achieve the goal of value creation in all phases;
- to develop methods and tools;
- to increase the knowledge of value creation and competences.

The project takes into consideration a clear connection between the design and operation of the buildings and values for the owners and users. To get good, adaptable and usable buildings over time, competent players are needed who have good decision and communication tools for projects and processes. Life Cycle Aspect is essential as an input in Early Phase Planning, and the processes through the following phases have to assure its inclusion in a way that value creation is complied with the user phase. In accordance with the objectives of the project, the relevant stakeholder group are: owners, users, planners/ designers, consultants and contractors, FM providers and society. The research is conducted by 22 project partners from three countries (Norway, Slovenia, Germany) from academic, private and public sector. All stakeholder groups are covered.

2.3 Research model

The mind-map model (Figure 3) is designed on the basis of European standard EN15221, which includes two headings 'space and infrastructure' and 'people and organization'. Value creation mind-map shows the inclusion of all stakeholders within the processes to maximize the value.

Project contains four main project working groups (WG), with a goal to:

- define the knowledge how to contribute to value creation in user phase as input in Early Plan Phase – WG1;
- define execution models and processes which contribute to value creation – WG2,
- design methods and tools on cost benefit evaluation simulation model and interactive guideline - WG3,
- create a library on 'value creation' and disseminate the results – WG4.

The first three working groups are closely interlinked (Figure 4), the fourth one is collective and supportive one and it works in parallel from the beginning of the project. For the purpose of this paper to show the first results, the WG1 and WG2 are presented more in details.

The focus of WG1 and questions discussing in it, are:

- Characteristics on buildings and solutions which contribute to value creation for different stakeholders during the Life Cycle.
- Characteristics on buildings and solutions which do not contribute to value creation for different stakeholders during the Life Cycle.
- Are contributions to value creation of different solutions context dependent?
- Circumstances where different solutions are advantageous or not.
- What kind of competences should stakeholders have for value creation?

The WG2 is interested in:

- Which means in different phases will motivate solutions for value creation in user-phase? (contract, economy incentives and process)
- Which means can work against?
- How can means that motivate value creation be incorporated in execution models within different projects and what demands will be put on different stakeholders?
- How can execution process with regard to transmission of information ('relay baton') between stakeholders and phases take place to ensure that premises from earlier phase live up to the next?
- What methods and tools are needed to ensure a good execution process and goal-achievement regarding value creation for owner and end-user?

Figure 3. Value contribution mind map

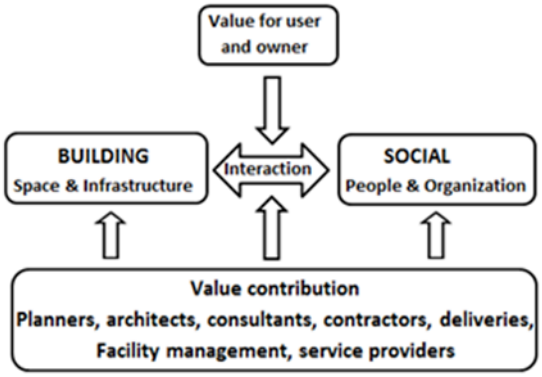
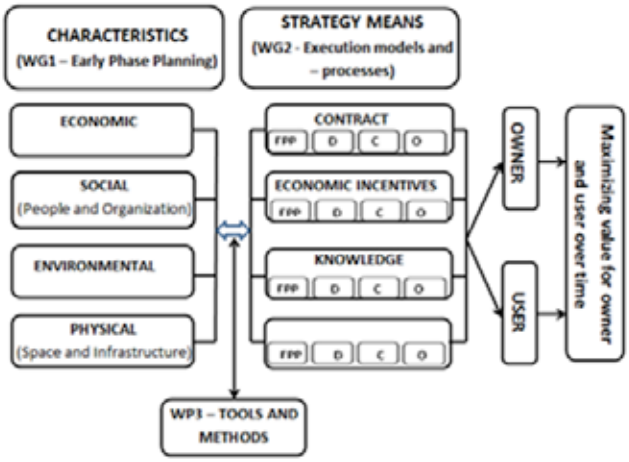


Figure 4. Value contribution model (EPP – Early Plan Phase, D – Detail Design Phase, C – Construction Phase, O – Operation (Use) Phase)



The research is led by Anne Kathrine Larssen from Multiconsult from Norway. The research methodology is based on qualitative and quantitative research methods, as: literature review, case studies, questionnaire interviews, survey and workshops.

2.4 Research results

Within the first phase of the project a list of characteristics, which contribute to value creation, and means, which motivate value creation solutions, is prepared, based on literature review conducted in autumn 2014 (Table 1). Characteristics which were mentioned in the literature in connection with value creation, are divided in 4 subgroups: economic, social, environmental and physical. Also means are divided in 4 subgroups: economic incentives, knowledge, contract, process, and assurance quality.

Table 1 – Characteristics and means of value creation from Literature review (Oscar project)

Project group focus	Subgroups	Characteristics or Means
WG 1 – Characteristics which contribute to value creation	Economic (MOME, core business cost, investment cost, economic value)	Energy consumption, optimum FM organization, maintenance plan / cost (predictability), outsourcing /price of services, transparency of costs, cost of ownership, running / operational cost, cleaning cost, space efficiency cost, rental cost, interaction of costs (best solutions not lowest costs), project cost, cost reduction, green accounting, potential income, strong brand, market value, payback time, profitability for the core business, productivity in construction phase, environmental portfolio, long term commitment partnership, financial situation
	Social (People and organization)	Architectural value, satisfaction, indoor climate / comfort, individual control of conditions, aesthetic value, open view, layout (open /cell space), enough space, orientation, cleanliness, logistic service support, organizational value, social responsibility, location characteristics, historic value, usability (efficient workplace), accessibility, safety, security,
	Environmental	Renewable energy, energy efficiency, recycling and reuse of materials, waste management, minimize contamination, environmental friendly products, life time materials, green roofs
	Physical (Space and Infrastructure)	Technical condition, space distribution / logistic for core business, quality materials, construction quality, architectural solutions, life cycle design, environmental solutions, flexibility possibilities, elasticity possibilities, generality possibilities, designed for disabled persons, sufficient infrastructure, innovative solutions
WG2 – Means which motivate value creation solutions	Economic incentives	Environmental funds, financial support for testing new trends, branding, rewarding, cost productivity, orientation, investment loan for enhancement / replacement, changing energy consumption, combining different energy resources, emission reduction, support for maintenance and technical upgrading, support for refurbishment, tax reduction, competitiveness
	Knowledge	Good planner, good management, changing regulations, new demands from society, social awareness, user satisfaction, communication ability, creating value with society, organizational development, best practice design, developing know-how training of employees, implementing new cooperation models, developing strategic KPI, knowledge on sustainable efficient building, open for new technical solutions supporting innovative ideas, establishing creative technical teams,
	Contract	Contract process with dialogue, contract division, contract type, contract procedure, selection and award criteria, contracting plan, PPP practice, clear tasks and definitions, contract duration, financial capacity of contractor, allocation of responsibility and risks, clear specification of deliverables, performance targets, measurement methods and standards, active partnership dialogue, organizational measures, developing strategic SLA,
	Processes and assurance quality	Process management ability, communicating value, political support, user's participation, performance requirements for each phase, mechanisms and procedures for ex-ante evaluations, mechanisms for ex-post evaluations, monitoring, inspecting, evaluating, success / failure factors, key performance indicators

The specific questions were focused to students from two faculties HiOA (High School University of Applied Sciences in Oslo and Akershus) and NTNU (Norwegian University of Science and Technology) to work on bachelor or master thesis. Some results are highlighted in Table 2.

Table 2 – Characteristics and means of value creation from Students' works

Project group focus	Sub-focus	Characteristics or Means
WG 1 – Characteristics which contribute to value creation	Contribution to Early Plan Phase	Cooperation - integrated architecture and technology from the first day - good cooperation and communication - establish a platform for quality insurance of information Adaptability - is of high importance in buildings with changing needs (ex. hospital build.) LCC - an important part from the starting point - calculation of alternatives gives opportunity to choose cost effective solutions and avoid unnecessary maintenance costs
WG2 – Means which motivate value creation solutions	PPP role in the context of Value Creation	– reduced conflicts due to cooperation and life cycle perspective – introduces incentives and clearer content in contracts – has a need for SLA´s in operation, maintenance and service deliveries, including condition at end of contract period – ensure maintenance, operation, management and enhancement (MOME) and quality level in the user phase

WG1 work is based on workshops and meetings with the partners. Most of the partners in the group are professionals (architect, engineers, facility managers etc.) and they have exposed uncertainty in discussions on defining and understanding 'value creation' in buildings. At the beginning of the work, questions put in discussion were like: what is the definition of value, how to quantify it, what is the correlation between value and cost, how to communicate value. Many of them have never thought of value as a factor to be considered in the projects, but are usually focused on costs. After a year working in the project, general understanding was created, using the findings of Literature review and professional experiences. Based on that knowledge, also a survey was prepared. In the table 3 some emphasis are stressed from their meetings.

Table 3 – Some emphasis from WG1 findings

Project group focus	Sub-focus	Characteristics or Means
WG 1 – Characteristics which contribute to value creation	Contribution to Early Plan Phase	Safety - is found interesting and important to include in development Operational solutions - should be included from the early beginning Users involvement - is positive and important part from the beginning - to be aware that users do not care of owner's strategic level (cost/benefit) - the communication with them should be end-product oriented (new buildings rather than strategic space management) Multidisciplinary focus - should be included from the early beginning on the equal based contribution (integrated architecture and engineering design) Owner's behaviour - to change the trend that it is more enticing to build new building than to refurbish old ones
	To prepare good questionnaire for ex-ante control	Value creation survey - should be standardized, based on value creation for the core business - should give the answers on connection between early stage of the project (including tenant management) and the results on core business value
	To increase professional competences in value creation	Professional competences - to understand professional competences on client and supplier side - to increase the knowledge about value creation - to find good mechanism to exchange the knowledge permanently - to develop multidisciplinary orientation
WG2 – Means which motivate value creation solutions	Project management role	– to define roles and mandates of participants from the beginning – balancing the roles from the early phase (owner, user, manager), – preparing good management strategy to involve the user in the early stage – creating good process control from the early phase – concentrating on value creation information and following them from EPP

WG2 work is based on workshops and meetings with the partners. Most of the partners in the group are experienced professionals, so they were mostly concentrated in the key problems which could be captured by the contractual level with the consequences on ensuring value through construction period. In the table 4 some emphasis are stressed from their meetings.

Table 4 – Some emphasis from WG2 findings

Project group focus	Sub-focus	Characteristics or Means
WG2 – Means which motivate value creation solutions	Contribution to Processes Contract Assurance quality	Functional requirements from the beginning - putting the values from user and owner perspective into contractual model - understanding the decisions/guidelines that have been adopted in early phase - to attain incentive value - selection of contractual models to keep the value for user and owner Advantages and disadvantages of the current contract models / contract forms Shared enterprise; General contract; General Enterprise; Total enterprise; Early partnership; Late partnership; Interaction Enterprise; PPP Contractual model for the best understanding of user's and owner's values - good and constructive dialogue during the construction phase - cost-effective building process - risk disclosure / distribution - balanced contractual model - interdisciplinary integrations and responsibilities clarifications - keeping incentives through the construction phase for goal achievement - good MOME addressed in a contractual model

Four special workshops with planners and designers with focus on EPP and contractual content on PPP have been held till spring 2015. The findings so far are highlighted in Table 5.

Table 5 – Characteristics and means of value creation from Special workshops

Project group focus	Sub-focus	Characteristics or Means
WG 1 – Characteristics which contribute to value creation WG2 – Means which motivate value creation solutions	Contribution to Early Plan Phase	– to decide crucial factors and secure them through the processes – decisions in early phase should not be easy to change later in the implementation process – if changes is to be taken the reason behind should be clarified, including consequences for core business purpose – better understanding/knowledge of core business as an important input – design team which can or should ask the right questions – integrated architecture and technology from the first day – documentation for MOME as a part of the total process
	PPP role in the context of Value Creation	– introduce new roles and earlier decisions – has a need for SLA´s in operation, maintenance and service deliveries including condition at end of contract period – ensure MOME and quality level in user phase – ensure a better commissioning period

3. DISCUSSION AND CONCLUSION

Value creation orientation exceeds the cost orientation of RE and FM, but still the owner' and user' benefits are measured from the perceived value of theoretical exchange value. The total solutions should bring benefit to the society.

To create value from early planning phase means that the solutions should be based on increased knowledge of core business activities, physical environment and open for future changes (technical or social). In the dialogue with the client the design team should be able to ask the right questions which are important for the value creation.

As it is stated innovation processes involve the exploration and exploitation of opportunities for new or improved products, processes and services', and 'innovation is inherently uncertain' (Pavitt, 2005). A typical innovation in service sector firms is 'interactivity', which means that services are customized or tailor made to particular customer or user needs (Miles, 2005).

A lot of good characteristics of value creation and instruments for motivating value creation were found during this short time, which is presented in tables 1-5. The very intensive discussions within working groups, students and planners show the need to sharpen the definition of value creation in the project and to achieve common understanding between all stakeholder groups.

Hotels are intensive resource users and will probably always be. But even for a hotels we claim there are potentials for reducing the negative impact on society and increase the creation of environmental, social and economic benefits, as for example to prepare environmental plan with the main focus on ways of maintaining the buildings and optimising energy consumption. There are many ways of FM services to contribute to environmental solutions (Olsen et all, 2015), if the focus allow consideration of lighting, catering, logistics, modes of transportation, purchase and green areas. Through green services, the hotel can improve its performance measured in consumption of energy, water and raw materials; use of recycled materials; green operational equipment and green suppliers.

Results and observations from discussions are put forward for further development in the project: to include operational solutions, to increase professional competences on value creation, to use multidisciplinary focus, to change the owner's behavior, to prepare a new model as constructive dialogue model in which good MOME orientation is included and keep incentives through construction phase. The interactive guideline, which has to include the model of interaction between investment, MOME cost and core business cost, is an important part of making decisions. It has to show the consequences for the core business purpose, when changes has to be taken.

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BITCOIN & CO: AN ONTOLOGY FOR CATEGORISING CRYPTOCURRENCIES

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ABSTRACT

As cryptocurrencies like Bitcoin become more and more influential and widely spread, a steadily growing target audience coming from the most diverse disciplines takes notice and interest in them. There are lots of discussions going on around the globe, whether or not Bitcoin can be considered a "real" currency and how to deal with its ecosystem from a juridical point of view as well as within the borders of monetary policy.

This paper proposes a model and, based thereupon, an ontology for categorising the different manifestations of cryptocurrencies available today. It takes into consideration the relevant publications by the ECB and the US FinCEN and tries to find a common ground. We address various aspects related to the subject like compatible technologies, applications and their interconnections. The findings are consequently tested and validated using appropriate methodology.

Our work results in an ontology implemented in languages of the semantic web that covers many of today's cryptocurrencies and categorises them by the aspects discovered earlier in the paper. This ontology contributes to a fairly new knowledge domain where varying interpretations and misunderstandings are common occurrences.

KEY WORDS: cryptocurrencies, currencies, bitcoin, ontology, semantic technologies.

1. INTRODUCTION

Today it is getting more and more difficult to ignore Bitcoin and other forms of cryptocurrencies. As the former Director of the U.S. Mint Ed Moy states: "Cryptocurrencies will likely play a pivotal role to modernizing the notions of money and finance and help usher in help a new global economy worthy of the 21st century" (Moy, 2015). While it is still unclear where the development will lead, it seems that governments, jurists and financial institutions are well advised to give more attention to the advances being made.

The financial crisis in recent years led to a loss of trust in financial intermediaries, trading platforms and payment systems. One of the most outstanding innovations of cryptocurrencies is their ability to avoid the need for a trusted third party (Blundell-Wignall, 2014). This also includes dramatically lower transaction fees, especially for international transactions. Estimations say that using Bitcoin over traditional payment providers could theoretically save over 100 billion dollars of transaction costs p.a. (Goldman Sachs 2014).

The lack of regulations and legal definitions lead to a very unclear situation. While some governments are starting to recognise cryptocurrencies, they are regulated against by others. The Chair of the Board of Governors of the U.S. Federal Reserve System said "It's important to understand that this is a payment innovation that's happening outside the banking industry. […] The Federal Reserve simply does not have the authority to regulate Bitcoin in any way." (Yellen, 2014). The ECB states that "regulatory responses are likely to be more effective if they are internationally coordinated" (ECB, 2015).

This paper should contribute to clarify the current state by proposing definitions and classifications for various types of cryptocurrency economic systems. In chapter 2 we define common terms that are used throughout the paper and in the following chapters we propose properties for currency schemes and try to find categories that they can be subsumed into.

2 DEFINITIONS

2.1. Money

From an economic point of view, money traditionally is defined as having three primary attributes (ECB, 2012; Surowiecki, 2012):

- It may be used as a medium of exchange in the role of an intermediary in trade to avoid the need for barter.
- It needs to act as a standardised numerical unit of account, thereby measuring the value and cost of goods, services, assets and liabilities.
- It has to be able to store value where the money can be consumed at a later date.

From a legal perspective, anything that is used widely to exchange value in transactions is usually seen as money (ECB, 2015). Money has been historically found in written records since 3000BC, where it was used as a commodity for trade and social exchange. Over time usage of money became more prevalent in scope as it encompassed entire countries, first using the base value of the metal of the coinage as the basis of value, through to the 15th century where paper based money was first used in China. This evolution demonstrates that the value of money depends on the willingness of economic agents to accept it, no matter what material the money is made of. Trust is the central requirement for money where all participants agree to a value of the commodity used as money (Skaggs, 1998; Surowiecki, 2012).

2.2. Currency

There are various definitions of currency. Nelson (2011) defines currency as "a country's currency that is backed by that country's government. This backing can either be by fiat – government regulation or law – or by commodity such as the Gold Standard the U.S. used to use". FinCEN (2013) regulations define currency (also referred to as "real" currency) as "the coin and paper money of the United States or of any other country that [i] is designated as legal tender and that [ii] circulates and [iii] is customarily used and accepted as a medium of exchange in the country of issuance". ECB (2012) states that currency is any legal tender designated and issued by a central authority. Currencies are regulated and centralised, and each country sets out a system that governs how the currency functions and provides monetary policy to the population that determine its monetary value.

Taking the common elements of these definitions into account, we can state that for a currency to exist, it must be written into the government regulations of a country and legally issued by a central authority of that country. This also leads to the conclusion that as soon as a single country accepts any cryptocurrency as legal tender this cryptocurrency becomes a legitimate and lawful currency in that country and as a consequence a foreign currency in every other country of the world.

2.3. Cryptocurrency

"Cryptocurrency" is commonly used to describe blockchain-based transaction systems and economic systems. We acknowledge the entomology of word cryptocurrency as being derived from: (a) cryptography, in recognition of the cryptographic methods employed by the blockchain ecosystems, and (b) currency, in recognition that the blockchain ecosystem is providing a monetary transaction system.

The Oxford dictionary defines cryptocurrency as "a digital currency in which encryption techniques are used to regulate the generation of units of currency and verify the transfer of funds, operating independently of a central bank: 'decentralised cryptocurrencies such as bitcoin now provide an outlet for personal wealth that is beyond restriction and confiscation'".

However, as cryptocurrencies are not regulated by any government, they cannot be defined as a currency in accordance with the currently accepted definition of currencies as described in 2.2, and as such, the term cryptocurrency is used as a label to describe blockchain-based transaction systems. In addition to cryptocurrency we also use the term "Virtual Currency Scheme" as proposed by the ECB and described in chapter 2.4.

2.4. Virtual Currency Scheme

The ECB uses the following definition for virtual currencies: "a digital representation of value, not issued by a central bank, credit institution or e-money institution, which, in some circumstances, can be used as an alternative to money" (ECB, 2015). Based thereupon, the term "Virtual Currency Scheme" (VCS) is used "to describe both the aspect of value and that of the inherent or in-built mechanisms ensuring that value can be transferred" (ECB, 2015).

The earlier definition "A virtual currency is a type of unregulated, digital money, which is issued and usually controlled by its developers, and used and accepted among the members of a specific virtual community" (ECB, 2012) was revoked by this new term. VCS can therefore be seen as a superclass of cryptocurrencies, this is also reflected in our model.

"Virtual Currency Schemes, such as Bitcoin, are not full forms of money as usually defined in economic literature, nor are virtual currencies money or currency from a legal perspective. Nevertheless, VCS can/may substitute banknotes and coins, scriptural money and e-money in certain payment situations." (ECB, 2015)

In comparison, FinCEN guidance focusses on the "convertible" aspect of virtual currencies and the participants involved in the exchange of "convertible" virtual currencies into fiat currency. FinCEN acknowledges the decentralised characteristic of cryptocurrencies, but does not consider types of cryptocurrencies as their focus

is the Administrators and Exchangers of Virtual Currency (FinCEN, 2013). As such, FinCEN guidance does not provide much insight into types of Virtual Currency Schemes.

2.5. Currency Scheme

We define Currency Schemes as inclusive of any type of fiat or local currency or Virtual Currency Schemes used for transactions without necessarily meeting the definition of currency.

3. CRYPTOCURRENCY ECOSYSTEM

3.1. Primer

Developed by Satoshi Nakamoto and first introduced with the creation of Bitcoin, cryptocurrencies are a new form of virtual currency. A cryptocurrency is a purely decentralised peer-to-peer electronic cash system and is the first technology to successfully overcome the requirement for a centralised party to validate transactions. The cryptocurrency ecosystem combines several blended features to provide decentralised money, mint and transaction processing functions, all stored on public ledgers within a quasi-anonymous framework (Brikman, 2014).

Nakamoto defines an electronic coin as a chain of digital signatures in the form of blocks (Nakamoto, 2008), which when chained together cryptographically forms the cryptocurrency blockchain. The blockchain is the public ledger, a database of all transactions ever executed in the currency, and shared by all nodes participating in the cryptocurrency ecosystem.

Cryptocurrencies use public-key cryptography to validate transactions between all participants. The public key can be considered as the participant's account number whilst the private key represents the participant's ownership credentials. All participants have digital wallets that are used to store the private keys, as well as the digital signatures that represent the cryptocurrency bitcoin entitlements that the participants owns. The use of digital signatures ensures transactional integrity and non-repudiation. (Peteanu, 2014)

As a peer-to-peer decentralised technology, cryptocurrencies historically rely on a network of low cost computers called "Miners" which run software that performs the primary functions within the cryptocurrency ecosystem. This software, used by each node, creates new blocks through cryptographic mechanisms (referred to as Proof), incentivises miners for utilising their computing resources by rewarding them with bitcoins when the node discovers a new block, maintains a full copy of the blockchain; and participates in the transaction validation process.

3.2. Transactions

Cryptocurrency transactions are a message between participants, and consists of 3 segments: (i) Signature, the originator's digital signature signed with the originator's private key so that other cryptocurrency nodes can verify the message really came from the originating participant; (ii) Inputs, a list of the signatures of transactions already in the ledger where the originator was the recipient of the bitcoins and the input bitcoins are the funds the originator uses in the transaction; (iii) Outputs, a list of how the funds in the inputs should be distributed. All the funds in the inputs must be redistributed in the outputs, so the originator will pay the recipient the required fund and pay themselves the remainder as change.

As the recipient is identified by their public key, cryptocurrency transactions can be traced through the blockchain through to the beginning of the creation of the bitcoin. This forms the mechanism for checking the ownership of bitcoins. Publically verifiable transactions by any node avoids double spending and provides a high degree of certainty to the participants of the cryptocurrency ecosystem.

When a transaction occurs it is broadcast onto the cryptocurrency network for verification by the nodes to prevent double spending of the bitcoin. As nodes receive the transaction they independently verify the validity of the transaction, and the greater number of nodes accepting the transaction, the less likely it is to be a double spend. Participants can quickly ascertain if there are issues with the validity of the transaction if the immediate responding nodes reject the transaction.

4. PROPERTIES OF CURRENCY SCHEMES AND CRYPTOCURRENCIES

We have created a model for currency schemes based on ECB and FinCEN definitions, and identified the characteristics of the various types of Virtual Currency Schemes. We have applied and extended the initial ECB Virtual Currency Schemes model to include a more properties of existing (and potential future) cryptocurrencies with the outcome of create classes for cryptocurrencies. The following sections describe the characteristics that form the Currency Schemes and cryptocurrency classes.

4.1. Legal Status

Legal Status is a fundamental characteristic of Currency Schemes because a currency by definition must be incorporated into law and issued as Legal Tender by a government of a country, and as such is Regulated by the government. Other Currency Schemes and cryptocurrencies are not under the control of any government, are therefore not Legal Tender, and as such are Unregulated.

4.2. Centricity

Centricity is a new characteristic for Currency Schemes with the advent of the decentralised nature of cryptocurrencies. The peer-to-peer design of cryptocurrencies was intended to mitigate the risks associated with a central party performing transaction processing, as well as reduce threat of shutdown by a targeted attack on a node, distributed denial of service, or shutdown of the cryptocurrency through government intervention. The types of Centricity include: (i) Centralised, where a central entity undertakes transaction processing; (ii) Distributed, there is no central entity and transaction processing is undertaken through the peer-to-peer network of anonymous "miner" nodes, examples including cryptocurrencies such as Bitcoin (bitcoin.org) and NXT (nxt.org); (iii) Decentralised, a central authority controls the transaction processing which is undertaken by a network of authorised ledger nodes, such as Ripple (ripple.com).

4.3. Format

The Format for Currency Schemes is a relatively new characteristic as a result of the digital age of computing. Currency Schemes have historically been based on physical coins or paper, however most Currency today is represented in a Digital format without any underlying association with value of a physical asset (such as the abandoned Gold standard). The ECB also defines Format as shown in Figure 2 in Section 4.1.

4.4. Control & Issuance

The Control & Issuance characteristic defines the authority that controls the monetary policy and supply, and that is allowed to generate units in a Currency Scheme (ECB, 2015). We have identified three types of issuer: (i) Government, where the regulated central banking authority can issue new money; (ii) Private, where the owner of the Currency Scheme can issue new private money into the private economic system; (iii) Network, where the peer-to-peer network can issue cryptocurrency units. For example, Bitcoin network automatically issues bitcoins to miners for successful hash solutions based of Proof-of-Work, whilst the NXT network automatically issues nxtcoins to miners based on Proof-of-Stake. However, SolarCoin uses an incentive-based allocation method for their SolarCoins, which are distributed manually by the owner on the basis that a participant can prove that they have generated 1MWh of solar energy (solarcoin.org), making Solarcoin a privately issued cryptocurrency.

4.5. Validating System

As a characteristic of Currency Schemes, the "Validating System" is defined by the ECB as "the methods used for validating the transactions made and securing the network" (ECB, 2015) with the primary goal of preventing double spending of money. The Validation System is a technical construct or mechanism that validates each transaction. There are three forms of Validating Systems: (i) A Bank computer system, which provides a centralised accounting ledger for debiting and crediting accounts using fiat currency; (ii) A Private system, where a private organisation undertakes some form of centralised function for debiting and crediting accounts using a form of private currency in a private economic system; (iii) Algorithm-based, distributed or decentralised transaction processing of cryptocurrency bitcoins for debiting and crediting accounts within the cryptocurrency economic system.

Cryptocurrencies use a variety of algorithms for validating transactions, the primary algorithms being Proof-of-Work and Proof-of-Stake, and sometimes a combination of the two algorithms. Proof-of-Work cryptocurrencies use specific hashing functions for block discovery, with leveraging a principle of hashing where a digest of a hash is relatively easy to verify, but very difficult to create. Proof-of-Work has had several weaknesses identified including security, scalability, performance, reward system, power consumption (Courtois, 2014; Kaye, 2014), hence Proof-of-Stake algorithms were proposed and implemented in an effort to overcome several of these problems. Proof-of-Stake means proof of ownership of the currency, and requires the owner to hold a certain amount of currency for some time before it is able be used to mint a block (Buterin, 2013; Kaye, 2014). With Proof-of-Work, the probability of minting a block depends on the work done by the miner, however with Proof-of-Stake the probability of solving the block is determined by how many coins have been sitting in the miner's wallet for at least 30 days. Proof-of-Stake is used to build the security model of a peer-to-peer cryptocurrency as part of its minting process, whereas Proof-of-Work mainly facilitates the minting process and gradually reduces its significance (King & Nadal, 2012). Proof-of-Stake also has potential security issues of a different nature to Proof-of-Work that will need to be overcome (King & Nadal, 2012; Vasin 2014)

4.7. Source

Addition of Source as a characteristic is a reflection on the transparency that the Currency Scheme provides to the stakeholders of the Currency Scheme. There are of course two types of Source – Open-Source and Closed-Source. Open Source is widely promoted for allowing anyone to investigate the source code to assess its functionality, quality, reliability, identify security issues and such like (e.g. Money et al., 2012). In order to foster trust in a distributed economic system such as a cryptocurrency, most cryptocurrencies are released as Open-Source. Closed-source maintains all code as private and confidential, and vendors do not release source code to stakeholders. As such, stakeholders must have complete trust in the Closed-source vendor, and cannot easily verify functionality or identify security risks.

4.8. Purpose

As demonstrated in this section, new characteristics are being defined through the introduction of cryptocurrencies into the family of Virtual Currency Schemes as defined by ECB (2012, 2015). Some cryptocurrencies have been designed to overcome specific issues, some have been designed to improve resource utilisation, whilst yet others have a broader vision that use combinations of methods to create new functions and applications that are grounded in cryptocurrency methodology.

Each cryptocurrency transaction includes a script capability that can provide a certain rules-based scripted intelligence to be added to each transaction. This is like each transaction having a Harry Potter ™ "Dobby" house-elf holding a gold coin, and who is able to evaluate various conditions and inputs before committing the spending of that coin. First generation cryptocurrencies such as Bitcoin provides a basic script capability that is used to ensure integrity of the transaction flow for each transaction. However, second generation cryptocurrencies have additional functions that improve the level of Dobby intelligence so that smarter decision making can be implemented without requiring human input. In addition, second generation cryptocurrencies can have capabilities that allow applications to integrate with the blockchain directly and run as distributed applications.

The definition of the Purpose characteristic in the context of this work is to classify any additional benefit over and above the standard transaction function of a Currency Scheme. We have identified three Purposes currently in use, as follows.

(i) Transaction Only Currency Schemes have the sole purpose of debiting and crediting accounts and validating transactions. Examples of Transaction Only Currency Schemes include Fiat Currency, Warcraft Gold, Linden Dollars and cryptocurrencies that are transaction only, such as Bitcoin.

(ii) Transaction and Application type generally applies to second generation cryptocurrencies, where in addition to transaction capabilities, the cryptocurrency has some form of additional application or function integration that is useful outside of the transaction aspect of the cryptocurrency. Third party applications can directly utilise these features in the cryptocurrency blockchain.

(iii) Transaction and Application Platform are second generation cryptocurrencies that provide a "Turing Complete" platform for third party application development and support for distributed applications (DApp), where no central node is running the application.

4.9. Function Integration

Following from Purpose, the characteristic Function Integration is used to further refine two types of cryptocurrencies: (i) those that have Native embedded blockchain applications or function integration; and (ii) those that have External blockchain applications or function integration. This distinction is essential because embedded functionality changes and innovations are provided by the cryptocurrency developers, whilst external functionality and innovations are provided by third party developers.

5. CATEGORIES OF VIRTUAL CURRENCY SCHEMES

While the quantity of established currency schemes (see 5.1.) stays straightforward and stable, the number of cryptocurrencies changes almost daily. At the time of writing, around 600 cryptocurrencies can be distinguished (coinmarketcap, 2015). This is why there is a need to introduce generically applicable categories, which not only cryptocurrencies available today can be sorted into but also are prepared to accommodate future implementations.

While FinCEN (2013) focuses on the distinction between centralised and decentralised virtual currencies, we go more into detail and differentiate even more types. The centralised virtual currency schemes are described in section 5.1. and the decentralised virtual currency schemes described in the later sections.

5.1. Summary of established currency schemes

Clearly, the first category is the established type of fiat money. This type not only includes the physical format in the form of banknotes and coins but also digital formats in the form of government backed E-money (EU, 2009) and commercial bank deposits.

The second category is called LOCAL and is intended for certain types of local currencies that were established in the past decades in various regions. One remarkable example of this category is Freigeld, a local currency established in Wörgl, Austria in 1932. The built-in demurrage of this currency has been transferred to cryptocurrencies like Freicoin. Another currency of this category that has emerged in recent years is the Detroit Community Scrip (e.g. Kavanaugh, 2009).

When it comes to digital-only currency schemes, ECB (2012) differentiates three types:

- Closed money flow schemes with almost no link to the real economy. The virtual currency can only be earned and spent within the virtual ecosystem and traded within the community. One example is Blizzards World of Warcraft Gold.
- Schemes with unidirectional flow where the virtual currency can be purchased using real currency but can not be exchanged back. Facebook credits was one of those until it was removed from the system in 2013. Another example are the frequent flyer programmes of many airlines, these programmes have reached outstanding values, even surpassing the total amount of U.S. dollar notes and coins in circulation (Economist, 2005).

- Schemes with bidirectional flow where users can buy and sell virtual money according to the exchange rates with their currency. One example for this type are Linden Dollars, the currency that can be used for buying and selling goods and services in the virtual world Second Life. However, we exclude cryptocurrencies from this type as our proposed model and ontology have separate characteristics and classes for cryptocurrency Virtual Currency Schemes.

5.2. Transaction only Cryptocurrency

Transaction only cryptocurrencies meet the requirement of being focussed on providing monetary transactions between accounts in the economic system, whilst having a non-master Authoritative Blockchain Verification Method and Algorithm-based Validating System. These are typically the first generation cryptocurrencies such as Bitcoin, Peercoin and Ripple, built to provide the distributed or decentralised transaction validation.

Although these cryptocurrencies provide basic scripting functionality to facilitate transaction integrity, they do not provide any additional application functionality. We define Transaction only Cryptocurrency as type VCS 1.

5.3. Native Blockchain Application

Native Blockchain Applications are defined as Virtual Currency Schemes that provide additional application functionality built into the cryptocurrency or blockchain. By definition, all cryptocurrencies rely on transactions, but this type does not require an application to have monetary use-case. The blockchain has many future applications outside of the monetary context most commonly used, and we expect that many applications that leverage the blockchain will appear. Native Blockchain Application examples include: (i) NXT, with its embedded applications such as its Trustless Financial Ecosystem, decentralised marketplace, and encrypted messages; (ii) Namecoin, with its embedded private domain name service functions; (iii) Maidsafe, providing a distributed network for file storage (Massive Array of Internet Disks). We define Native Blockchain Applications as type VCS 2.

5.4. External Blockchain Application

Similarly to Native Blockchain Applications, External Blockchain Applications also provide additional application functionality to the cryptocurrency or blockchain ecosystem, but do so through an external interface to the blockchain. These applications process the blockchain natively and are programmed to interact accordingly with the blockchain. However, External Blockchain Applications are centralised in nature (they run as a service and require their own server to function) and are under the control of a third party developer.

Examples include: (i) Counterparty, which uses the Bitcoin network to provide a platform for free and open financial tools; and (ii) Gridcoin, which is the first blockchain protocol that works with Berkley Open Infrastructure for Network Computing (BOINC) hosted network, to provide almost any kind of distributed computing process such as SETI@Home (Search for Extraterrestrial Intelligence) and Poem@Home protein folding modelling.

We define External Blockchain Applications as type VCS 3.

5.5. Transaction & Application Platform

A Transaction and Application Platform is defined as a cryptocurrency and blockchain that provides an embedded Turing complete contract language that allows for full Distributed Applications (DApps) to be designed and run on the application platform. This functionality is distinct in that the Turing completeness will allow conditions and loops to be implemented, something that other cryptocurrencies do not support by design.

This capability means that the Dobby attached to each transaction can be programmatically created to provide any level of automated decision making based on any factors or given limitations. An Internet of Things vending machine can negotiate a contract with suppliers for replacement orders, with parameters including pricing, delivery schedules, loading the machine, acceptance and payment. The single example of a Transaction & Application Platform is the Ethereum Project, with its first live release called Frontier on 30 July 2015.

We define Transaction & Application Platform as type VCS 4.

5.6. Regulated Virtual Currency

Besides the possibility of some government accepting an already existing and commonly used cryptocurrency as a legal tender currency (as described in chapter 2.3.), there might also emerge cryptocurrencies specifically designed for central banks maintaining full control. One example of this category is RSCoin (Danezis & Meiklejohn, 2015), which allows for a centralised monetary policy combined with a distributed validating system for prevention of double-spending.

There are distinct advantages of cryptocurrency technology in a government sense, where transactions are taxed automatically at the time of transaction, regardless of the global location of the participants, and taxing of micro-transactions are easily supported. The government could insert various algorithms in a government controlled cryptocurrency to enable and automate many types of financial, health and social support processes. Government interest is expected to grow with comments from Moy (2015), former Director of the U.S. Mint expressing how cryptocurrencies are evolutionary.

As such, this type is a placeholder on our model, and we define Regulated Virtual Currency as Type RVC.

6. ONTOLOGY

Our ontology was built using languages of the Semantic Web. The basic idea of these technologies is to make various forms of content meaningful to computers (Berners-Lee et al., 2001). This starts with very simple and popular techniques like tagging pictures and documents with the intention of enabling the computer to understand what is depicted or written, respectively. More advanced techniques include building whole models of specific knowledge domains and have the computer generate new pieces of knowledge based on the already known by reasoning algorithms.

In our case we used the Web Ontology Language OWL in its 2nd edition (Hitzler et al., 2012) to create a model of currency schemas and their properties. We only make use of basic features of OWL2 in order to keep the ontology comprehensible and universally usable. There always is a trade-off between high-level expressiveness on one side and decidability and the availability of practical reasoning algorithms on the other.

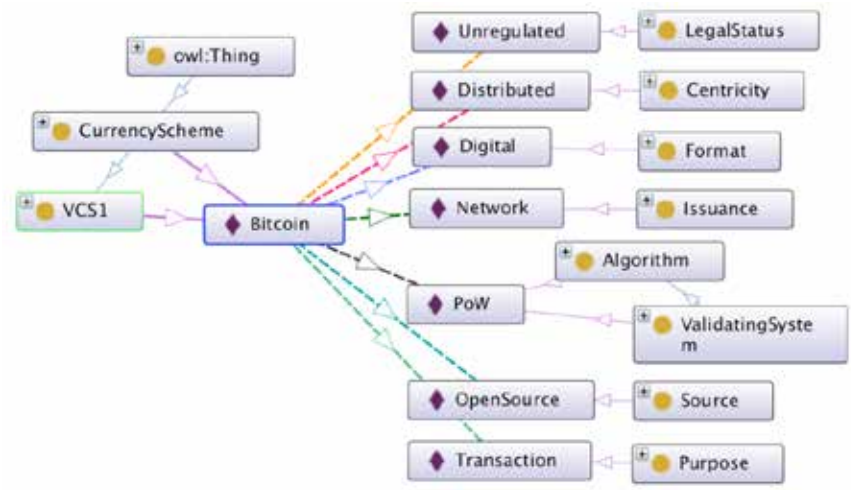
Table 1 shows an overview of the types we built into the ontology. This does not contain all the properties or all tested cryptocurrencies but should give an idea of the model created.

Table 1. Model of Currency Schemes

Legal Status	Regulated	Unregulated								Regulated
Centricity	Centralised					Decentralised/Distributed				
Format	Physical or Digital	Physical	Digital							
Control and Issuance	Government	Private				Network/Private				Government
Validating System	Bank	Private				Algorithm (PoW, PoS etc)				
Source	Closed Source					Mostly Open Source				
Purpose	Transaction Only						Transaction & Application		Transaction & Application Platform	?
Function Integration	Not Applicable						Embedded	External	Embedded	?
Type	**FIAT**	**LOCAL**	**ECB 1**	**ECB 2**	**ECB 3**	**VCS 1**	**VCS 2**	**VCS 3**	**VCS 4**	**RVC**
Definition	Fiat	Local Currency	Closed	Uni-directional	Bi-directional	Transaction only Crypto-currency	Native Blockchain Application	External Blockchain Application	Application Platform	Regulated Virtual Currency
Examples	USD/EUR E-Money	Community Coins Detroit Scrip Freigeld	Warcraft Gold	Facebook credits Frequent Flyer Miles	Linden Dollars	Bitcoin, Peercoin, Ripplecoin, Solarcoin, Zerocash, Primecoin,	NXT, Namecoin, Maidsafe	Omni, Sidechains, Counterparty, Gridcoin	"Turing Complete Platform" "Bitcoin 2.0" Ethereum, Zerocash	RScoin (concept) Future

One of the main reasons for building the ontology in OWL is the ability to create new knowledge based on the known pieces of knowledge. In this case, all we did was give the Individual “Bitcoin” its correct values for all the properties, and the Reasoner automatically categorised Bitcoin as “Transaction only Cryptocurrency” of type VCS1. This can also be seen as a special form of testing the ontology, as one can always see if a certain cryptocurrency is being categorised correctly when inputting the respective properties. 1 depicts some of the main relations of Bitcoin as an exemplary cryptocurrency in the ontology.

Figure 1: Bitcoin in the ontology



Another option is to manually classify a cryptocurrency into a specific type. The Reasoner then automatically assigns all the properties that need to be fulfilled for individuals of that class. This also makes it possible to test the ontology and see if all properties are assigned correctly.

One has to be very careful with OWL and other languages of the Semantic Web though, as they make the so called open-world assumption (OWA). The main idea of OWA is that if a statement is not known, it is not automatically seen as false like it would be seen in relational databases and most programming languages. It is simply unknown, this way there can be a distinction between false statements from missing statements (Grimm, 2010). This can have unexpected effects for those who are not familiar with OWA systems. For example, one can not define VCS1 with the following OWL triples, saying that VCS1 can not have a purpose of Application nor one of ApplicationPlatform:

Class: VCS1

EquivalentTo:

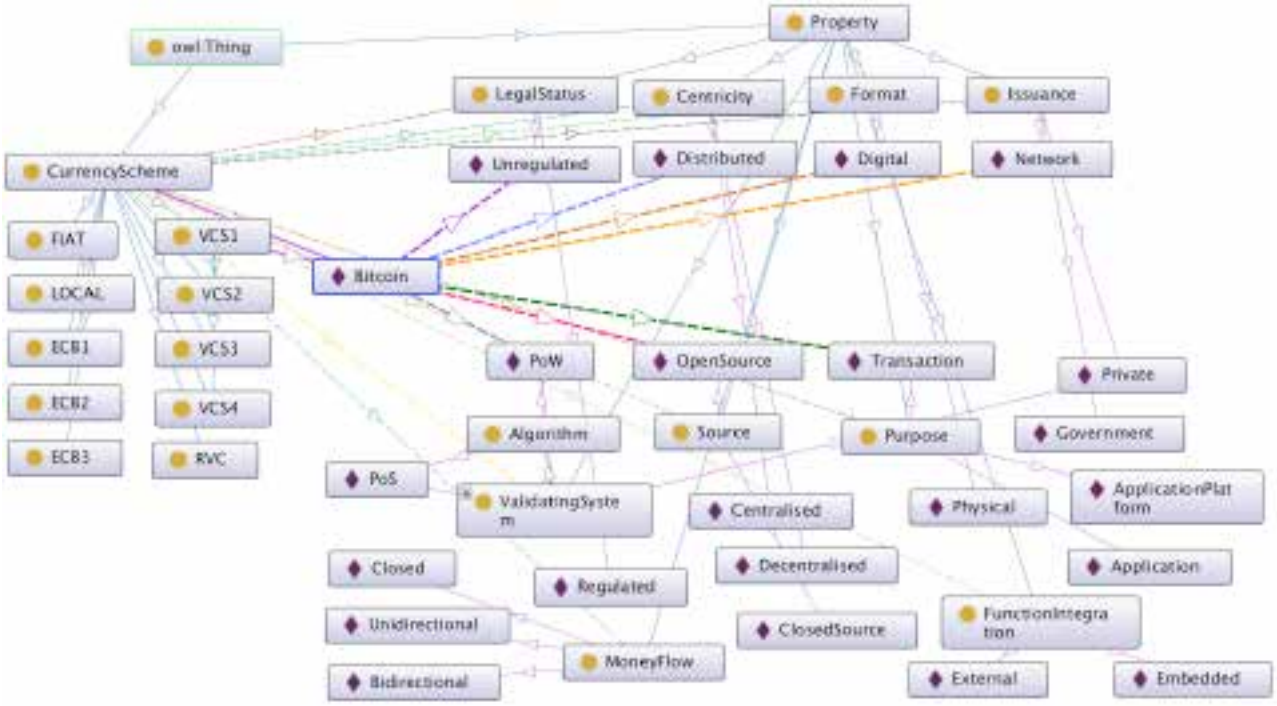
not ((hasPurpose value Application)

or (hasPurpose value ApplicationPlatform))

The reason for this not working is that there will never be an Individual fulfilling this restriction. There can always be knowledge that's not known so far including the knowledge that a specific cryptocurrency has another purpose than transactions. In OWA systems these unknown facts lead to this class being empty.

2 shows the bigger picture, again for Bitcoin as an example.

Figure 2: Ontology



7. CONCLUSION

In this paper, we have presented an ontology for categorising established currency schemes and cryptocurrencies. First we tried to find valid and unambiguous definitions for common terms that are often used not only throughout this paper but also by other parties. We then developed a catalogue of relevant properties that help to distinguish between different variations of VCS and proposed a model of 10 types that they can be fitted into. As diverging as these cryptocurrencies seem to be, they can still be aggregated in a few categories by choosing the right properties.

The approach of this paper is to contribute in clarifying the current state as well as preparing for the possible advances in future applications of cryptocurrencies. In particular, when having a look at current publications of various governments and financial institutions, very diverging points of view come to light.

We also can conclude that although cryptocurrencies are at present correctly defined as "Virtual Currency Schemes", all it would require is for a single country to accept any cryptocurrency such as Bitcoin as legal tender for that cryptocurrency to be recognised as a legitimate and lawful currency.

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CONSUMERS' AGE AND WORD OF MOUTH

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ABSTRACT

Turbulent marketing environment, where the consumers' economic and social roles in general are transforming, has caused businesses to accept the fact that consumer choice and decision making comprise a single social process, which does not depend only on the impact of companies' marketing mix elements on the consumers, but that this complex process is most determined by individual or group-based interactions and relationships between the consumers themselves through word-of-mouth communication.

Consumer behaviour at the market is determined by many factors, and is therefore characterized as very complex and difficult to predict. Consumers' age is one amongst many important factors that marketing theory and practice research on a daily basis. This paper attempts to address the impact of consumers' age on creation and diffusion of word of mouth resulting in purchase decision, and tries to point out some directions of thinking and future research, based on the experience from the Republic of Serbia.

KEY WORDS: consumer, word of mouth, buying decision.

1. INTRODUCTION

One of the basic characteristics of the current business setting and the marketing environment is the fact that businesses are slowly losing control of the flows of marketing information on the market, and that it is increasingly taken over by the consumers themselves.

Most of the completed, but also current marketing research focuses in detail on interactions between businesses themselves, as well as interactions between businesses and consumers, to explain the market's structure and dynamism. On the other hand, negligible effort has been made towards studying interactions between consumers themselves and the consequences of these interactions on purchase decision making. The contemporary problems of business operations and reduction in the return on marketing investment have placed a considerable question mark before the claim that consumer decision is merely a choice of one of the large number of alternatives offered by businesses on the market. The current business reality and marketing environment potentiate interaction between consumers themselves as a fundamental mechanism increasingly creating the shape and structure of the market.

This new marketing era is based on incessant interactions and communications between consumers across the global market, who thus share and consume information on all relevant dimensions of their existence. On the one hand, these changes facilitate businesses' identification and targeting of potential consumers, but on the other, businesses lose control over the messages they have sent to the target market. The emergence of the internet has accelerated and multiplied the communication process even more, completely relativising time and place as significant factors of the communication process.

According to the research of Webtrends Consultancies for 2009, attention is drawn on the following trends in consumer behaviour:

- Reduction in consumer loyalty, who increasingly display price oriented rather than brand oriented behaviour. The brand is still important, but the consumers' standards and expectations are at a much higher level than earlier;

- Reduction in consumer trust, especially in mass media, regardless of the industry the business belongs to, where the only growth in trust is recorded in face-to-face and the internet, i.e. electronic word-of-mouth communication between consumers; as many as 80% consumers put interpersonal word-of-mouth communication at the first place when it comes to the degree of trust.

- Increase in independence of the consumers, who make their buying decision decreasingly under the influence of businesses, and increasingly independently, based on their own information, gathered mostly by word-of-mouth communication.

The report further states that 10% to 40% consumers customize businesses' products and services independently, actively initiating communication with them, and thus shape their demands from businesses so that the application of 4R (Reveal, Reward, Respect and Retain your consumers) principle is suggested, and word-of-mouth communication plays the most significant role in these activities.

As enterprises today find it increasingly complex to achieve business success, they must invest an increasing amount of effort in researching consumer behaviour, striving to study not only individual factors influencing this behaviour, which are extremely numerous, but also to establish whether there is a certain interdependence of action of these factors on consumer behaviour.

This paper aims to present the phenomenon of interpersonal word-of-mouth communication and implications that it has on consumer behaviour, and, using statistical analysis, offer the answer to the research question:

- Is there a statistically significant correlation between consumers' age and generating, disseminating and effects of word-of-mouth communication?

2. LITERATURE REVIEW

Consumer behaviour in specific marketing situations is determined by numerous factors of internal and external character. Both groups of factors require equal amounts of attention. Although internal factors are more difficult to understand, it is the external factors – demographic, geographic, social and economic – that very often make the decisive impact on consumer behaviour and buying decisions. Demographic factors take up a special place in marketing research as the number, mobility, gender structure, and especially age structure, determine the potential of the market and consumer behaviour. Age significantly determines the differences in the process of purchasing products and services. At every stage of their lives, consumers differ by manifested requirements and desires, by purchasing power, by preferences, tastes, use and post-purchase assessment of products and services, in terms of communicating their satisfaction or disappointment to other consumer.

The so-called cohort effect (Schiffman, Kanuk, 2004, p. 57; Maričić, 2011, p. 169) is a very important one, referring to the fact that there are differences in behaviour between age groups depending on the time and the setting they grew up in, and, as such, retain thus acquired habits and behaviours, for instance baby boomers who, at their mature age, listen to rock music and drink Pepsi.

Word-of-mouth communication (Grönroos, 2004, p. 269) is defined as "messages and information on a business, its credibility, trust in it, the business' manner of operation, offer and quality of its products and services, exchanged in individual communication". Grönroos was one of the first marketing experts who analysed the phenomenon of this specific communication form by viewing through the prism of consumer perception and the prism of consumer-to-consumer relations on the market, thus attributing to it two significant dimensions of observation – psychological and social.

One of the leading marketing authorities, especially in the area of consumer behaviour, Michael Solomon (2011, p. 332) defines word-of-mouth communication as "communicating information on products and services from one individual to another". He also points to the still present high degree of significance of formal information sources, which he primarily equates with corporate advertising, especially in the case of developing brand awareness among consumers, but remarks that word-of-mouth communication gains predominance in the later phases of evaluation and acceptance of the product on the market. If the consumers hear positive impressions on a product from their friends, acquaintances and relatives, this increases the chance that they will purchase and accept the offered product and service.

Hanna & Wozniak (2009, p. 457) define word-of-mouth communication as "personal communication between individuals, where one of them plays the role of message recipient, whereas the other acts as the source, i.e. sender of a message that is regarded as non-commercial and relates to products, services or brands". Although it refers to businesses' products, services or brands, word-of-mouth communication is generated completely independently of the business; it is transmitted spontaneously and autonomously between consumers.

George Silverman defines word-of-mouth communication as "communication about a business' products and services occurring between individuals, assuming that they are independent of the businesses offering those products and services, and that this communication is conducted through media also independent of the business whose products are referred to" (2005, p. 25). Interpersonal word of mouth communication can flow through different types of media such as telephone, mail, the Internet etc.

Emanuel Rosen (2009) is another author researching the phenomenon of word-of-mouth communication, but in terms of its exploitation by businesses, criticising contemporary marketing executives for excessive investment of money and expectations into advertising and other traditional marketing instruments aimed at reaching the targeted individual consumer. The author considers word-of-mouth communication about a business and its products, services and brands to be "aggregated and personal" (2009, p. 7).

Keller and Berry (2003) devote the focus of their research to word-of-mouth communication, especially studying consumers who initiate and generate it, to whom they refer as "influential". These are consumers with "active minds, common sense, clearly defined priorities, self-confidence, firm beliefs and opinions, dedicated approach to life, who know more than other consumers, are the first to learn the news, and extend and share their experience and considerations with their environment" (p. 124).

Mowen defines word-of-mouth communication as messages exchanged face-to-face between partners in the exchange (1995, p. 551). Mowen was also among the first ones to study situations where the likelihood of occurrence of word-of-mouth communication is high, and in this sense he identifies three situations (1995, p. 552).

- when the products are 'visible' in the environment, i.e. have a certain symbolic and express the concept of the personal self;
- when the products are complex to use; and
- when the observed products are not easy to test before buying.

The contemporary consumers are very well informed and educated, not basing their buying decision on businesses' aggressive marketing, but rather on independent information received from other consumers with whom they engage in interactive relations.

Based on the changes in consumer-to-consumer relations, Libai, Bolton, Bugel, de Ruyter, Gotz, Risselada and Stephen (2010.) redefine interpersonal communication into a broader context than mere verbal, face-to-face communication. According to these authors (2010, p. 269) interpersonal communication is "C2C communication in a relationship used for transfer of information from one consumer (or a group of consumers) to another consumer (or a group of consumers) in such a manner that it has the ability to affect and change their preferences, actual buying behaviour, and their future relationship with the same and other consumers". The authors opine that interpersonal communication can also have a non-verbal form, when a consumer influences another consumer by his buying behaviour, through learning and observing. The effect is sometimes identical, and sometimes greater than verbal interpersonal communication. The authors see the consumer setting where they engage in C2C relationships as off line or traditional (face-to-face, in the shop, at work etc.) and direct, or online, through the internet (chat rooms, social networks, blogs etc.). The authors further especially emphasise the need to study specific consumers on the market who are the carriers and key generators of interpersonal communication. Individual consumers who have a greater influence on other consumers are referred in marketing literature as opinion leaders or influentials, and their identification and utilisation should be in any business' focus.

Research into causes and results of interpersonal communication implies the analysis of the following factors (Libai, Bolton, Bugel, de Ruyter, Gotz, Risselada and Stephen, 2010, p. 273):

- characteristics of consumers – causes and results, and the intensity and modes of spreading interpersonal communication are highly dependent on the consumers' psychological, demographic, sociological and other characteristics, by which all categories and segments thereof are differentiated;
- characteristics of products and services – if products are visible and outstanding, easy to test and try, symbolic or hedonistic, when the consumers have not necessary knowledge and experience of them, and when they are situationally convenient to the consumer, the likelihood of emergence of strong interpersonal communication is high;
- characteristics of media – the development of new technologies has changed the traditional interpersonal communication media, i.e. face to face and telephone. The media of today are mobile, where interpersonal communication is achieved by exchanging video, photo, voice or text (sms and mms) messages; it is also online, in the form of digital exchange of messages, and point-of-sale;
- characteristics of relations – imply temporal, spatial and social distance or vicinity of consumers in the relationship, determining the intensity and effects of interpersonal communication;
- characteristics of markets – depend on the activities of businesses, competitors, and consumers themselves, resulting in different levels and directions of interpersonal communication.

Taghizadeh, Taghipourian and Khazaei (2012) believe that interpersonal communication is the primary indicator of the business' future success. Consumer satisfaction and their loyalty generate positive interpersonal communication attracting new consumers, with simultaneous growth in the purchases by existing consumers. By understanding interpersonal communication in the sense that it is carried out between consumers about all aspects and emotions related to products and services on the market, the authors identify the following characteristics of interpersonal communication (2012, p. 2570):

- Informality – this communication flows outside all formal media and types of B2C marketing communication, so that it can have different forms of occurrence and content;
- Non-commercial character and credibility – at its core, interpersonal communication is generated without any financial interest or motive, and therefore affects consumers so strongly;
- Persuasiveness – refers to the key characteristic of interpersonal communication, due to which it is the source of research of marketing science and practice;

- Relevance – as interpersonal communication is either sought or provided by consumers who are close to those who need it, interpersonal communication is shaped in a manner convenient to the consumer, and is especially significant as such, because it reduces the risk of buying and increases confidence in the appropriateness of the made buying decision;

- Ever-presence – interpersonal communication is not temporally limited, and is always present in all forms of relations between consumers, and other stakeholders on the market;

Consumer generated – interpersonal communication is always related to the consumers, i.e. their needs, desires, dilemmas, fears etc; it flows from one set of consumers to another, and is forwarded to a third set of consumers.

Contemporary consumers are more often more willing to adjust their behaviour based on advice or recommendation from another consumer, than passively respond to marketing stimuli sent by businesses. It is therefore very important for these businesses to start appreciating the reality of C2C relation both in offline and online setting, according to the principle that intensive word of mouth communication leads to more intensive creation of relations between consumers, which further leads to an even stronger intensity of interpersonal word of mouth communication. C2C relations directly determine the enterprise's business result and position it takes on the market. Albeit positive, interpersonal communication attracts new consumers and affects the growth in positive buying decision, but reverse regularity is also in effect – if it is negative, whereby this communication affects general behaviour of consumers and their value for the business.

3. RESEARCH METHODOLOGY

The survey conducted in order to confirm or reject the hypotheses set in the study is a segment of a complex project of research into the phenomenon of the impact of consumer-to-consumer word-of-mouth communication on purchase decisions. The study uses a research method in the form of structured personal communication, i.e. questionnaire, whose dissemination and response retrieval, due to geographic dispersion and size of the research area (Serbia, Croatia and Slovenia), was conducted predominantly through the Internet – 1214 respondents or 80.2%, and personally – 299 respondents or 19.8%. The survey aimed at accomplishing the set research goals and confirming or rejecting the defined hypotheses was conducted from May until September 2014 on a defined stratified sample of 1513 respondents. Stratification was performed by gender, geographic location the respondents' age and education levels. The data gathered by means of the questionnaire were processed by appropriate mathematical and statistical methods, with the application of statistical SPSS software, as follows:

- Parametric tests:
    - Normal distribution – testing the hypothetical proportion value of the basic set, based on the sample;
    - Analysis of variance, i.e. ANOVA dispersion analysis with 1, 2, and 3 samples:
        - t-test
        - Levene's test

The questionnaire consists of 30 items, included in the survey and grouped in order to confirm or reject the set hypotheses and accomplish the set research objectives, but, due to limitations imposed by the conference, this article only presents a number of items, i.e. statements aimed to confirm or reject the defined hypotheses. The items are arranged with a Likert scale of offered reply options.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1	2	3	4	5

H_1 More mature/experienced consumers are more prone to generate word of mouth communication.

H_1 More mature/experienced consumers believe more that word of mouth communication reduces shopping risks.

Due to limitations imposed by the conference, this paper only presents only some of the statements from the survey.

4. ANALYSIS AND FINDINGS

Statement 1. **I communicate my experience of product and services, producers and retailers to others only when I am very satisfied or very dissatisfied with them.**

Table 1. Structure of replies by age

Statement 1.		(1) up to 30 yrs	%	(2) 31-45 yrs	%	(3) 46-65 yrs	%
Valid	Strongly disagree	63	4.9	24	13.0	0	0
	Disagree	42	3.3	13	7.1	0	0
	Neither agree nor disagree	75	5.9	2	1.1	10	19.2
	Agree	497	38.9	71	38.6	18	34.6
	Strongly agree	600	47.0	74	40.2	24	46.2
	Total	1277	100.0	184	100.0	52	100.0

As the p value is lower than 0.05, it is concluded with the probability of 95% that there are statistically strong differences between respondent age groups regarding Statement 1.

If the p-value is less than 0.01, the differences are HIGHLY statistically significant. As the difference is statistically different, post-hoc test is performed.

Table 2. ANOVA

		Sum of Squares	df	Mean Square	F	Sig
Statement 1	Between Groups	19.102	2	9.551	8.332	.000
	Within Groups	1730.828	1510	1.146		
	Total	1749.930	1512			

Table 3. Post-Hoc Tukey test

Dependent Variable	(I) Age2	(J) Age2	Mean Difference (I-J)	Std. Error	Sig.
Statement 1	1.00	2.00	.339*	.084	.000
		3.00	-.072	.151	.883
	2.00	1.00	-.339*	.084	.000
		3.00	-.411*	.168	.039
	3.00	1.00	.072	.151	.883
		2.00	.411*	.168	.039

The application of Post-Hoc Tukey test enables identifying the existence of two statistically significant differences in replies, between groups aged up to 30 years (1) and 31-45 years (2), and between groups aged 31-45 years (2) and 46-65 years (3). It is noted that the group aged 31-45 gives significantly low grades compared to other age groups when responding to Statement 1, which can point to the conclusion that more mature and young respondents are more prone to generate word of mouth communication as a consequence of outstanding satisfaction or dissatisfaction with product, services, producers and retailers, compared to middle-aged respondents.

Statement 2. **Despite negative comments by other consumers, I will very seldom still decide to buy a product/service.**

Table 4. Structure of responses by age

Statement 2.		(1) up to 30 yrs	%	(2) 31-45 yrs	%	(3) 46-65 yrs	%
Valid	Strongly disagree	101	7.9	10	5.4	0	0
	Disagree	172	13.5	19	10.3	0	0
	Neither agree nor disagree	151	11.8	7	3.8	5	9.6
	Agree	567	44.4	96	52.2	25	48.1
	Strongly agree	286	22.4	52	28.3	22	42.3
	Total	1277	100.0	184	100.0	52	100.0

As the p value is lower than 0.05, it is concluded with the probability of 95% that there are statistically strong differences between respondent age groups regarding Statement 2.

If the p-value is less than 0.01, the differences are HIGHLY statistically significant. As the difference is statistically different, post-hoc test is performed.

Table 5. ANOVA

		Sum of Squares	df	Mean Square	F	Sig
Statement 2	Between Groups	36.368	2	18.184	13.250	.000
	Within Groups	2072.286	1510	1.372		
	Total	2108.654	1512			

Table 6. Post-Hoc Tukey test

Dependent Variable	(I) Age2	(J) Age2	Mean Difference (I-J)	Std. Error	Sig.
Statement 2	1.00	2.00	-.276*	.092	.008
		3.00	-.728*	.166	.000
	2.00	1.00	.276*	.092	.008
		3.00	-.452*	.184	.038
	3.00	1.00	.728*	.166	.000
		2.00	.452*	.184	.038

The application of Post-Hoc Tukey test enables identifying the existence of two statistically significant differences in replies, between groups aged up to 30 years (1) and 31-45 years (2), and between groups aged 31-45 years (2) and 46-65 years (3). It is noted that the group aged up to 30 gives significantly lower grades, i.e. expressed the highest agreement, compared to other age groups when responding to Statement 2, especially compared to the group aged 46-65, who gave the highest grades, i.e. expressed the highest agreement, with the statement that they will very seldom decide to buy if there is negative word of mouth communication. It can be concluded from the results of statistical processing that respondents of primarily mature age are the most prone to give up the purchase due to negative word-of-mouth communication of other consumers. The youngest respondents, aged up to 30 years, are the least prone to give up a purchase when there are negative comments of other consumers about products and services. Such a state can partly be explained by a certain degree of stubbornness of younger consumers and rational attitude of the more experienced.

Statement 3. **I tend to share my experiences about products and services more with consumers I know, such as friends and relatives, rather than those I do not know.**

Table 7. Structure of answers by age

Statement 3		(1) up to 30 yrs	%	(2) 31-45 yrs	%	(3) 46-65 yrs	%
Valid	Strongly disagree	33	2.6	18	9.8	3	5.8
	Disagree	50	3.9	12	6.5	2	3.8
	Neither agree nor disagree	58	4.5	/	0.0	/	0.0
	Agree	319	25.0	65	35.3	8	15.4
	Strongly agree	811	63.5	89	48.4	39	75.0
	Total	1271	99.5	184	100.0	52	100.0
	unanswered	6	.5	/	0.0	/	/
Total		1277	100.0	184	100.0	52	100.0

As the p value is lower than 0.05, it is concluded with the probability of 95% that there are statistically strong differences between respondent age groups regarding Statement 3.

If the p-value is less than 0.01, the differences are HIGHLY statistically significant. As the difference is statistically different, post-hoc test is performed.

Table 8. ANOVA

		Sum of Squares	df	Mean Square	F	Sig
Statement 3	Between Groups	23.361	2	11.681	11.839	.000
	Within Groups	1483.866	1504	.987		
	Total	1507.228	1506			

Table 9. Post-Hoc Tukey test

Dependent Variable	(I) Age2	(J) Age2	Mean Difference (I-J)	Std. Error	Sig.
Statement 3	1.00	2.00	.376*	.078	.000
		3.00	-.064	.141	.892
	2.00	1.00	-.376*	.078	.000
		3.00	-.440*	.156	.013
	3.00	1.00	.064	.141	.892
		2.00	.440*	.156	.013

The application of Post-Hoc Tukey test enables identifying the existence of two statistically significant differences in replies, between groups aged up to 30 years (1) and 31-45 years (2), and statistically significant differences in answers between groups aged 31-45 years (2) and 46-65 years (3). It is noted that the group aged 31-45 years (2) gives significantly lower grades, compared to age groups up to 30 years (1) and 46-65 years (3) when responding to Statement 3, whether they generate their experiences interpersonally and share them more with consumers they know such as friends and relatives rather than consumers they do not know. This can be partly explained by a certain social position that middle-aged consumer segment has in a society where the width of their social interaction is far greater than that of younger and the oldest consumers, so that they often interact with individuals they do not even know, but may have interpersonal influence on them.

Statement 4. **Advice from other consumers reduces the risk of wrong buying decision and increase confidence in the correctness of one's own buying decision.**

Table 10. Structure of answers by age

Statement 4		(1) do 30.god	%	(2) 31-45.god	%	(3) 46-65.god	%
Valid	Strongly disagree	40	3.1	9	4.9	/	0.0
	Disagree	103	8.1	19	10.3	/	0.0
	Neither agree nor disagree	126	9.9	15	8.2	/	0.0
	Agree	678	53.1	94	51.1	35	67.3
	Strongly agree	315	24.7	47	25.5	17	32.7
	Total	1262	98.8	184	100.0	52	100.0
	unanswered	15	1.2	/	0.0	/	/
Total		1277	1277	100.0	184	100.0	52

As the p value is lower than 0.05, it is concluded with the probability of 95% that there are statistically strong differences between respondent age groups regarding Statement 4.

If the p-value is less than 0.01, the differences are HIGHLY statistically significant. As the difference is statistically different, post-hoc test is performed.

Table 11. ANOVA

		Sum of Squares	df	Mean Square	F	Sig
Statement 4	Between Groups	10.722	2	5.361	5.634	.004
	Within Groups	1422.651	1495	.952		
	Total	1433.373	1497			

Table 12. Post-Hoc Tukey test

Dependent Variable	(I) Godine2	(J) Godine2	Mean Difference (I-J)	Std. Error	Sig.
Statement 4	1.00	2.00	.071	.077	.628
		3.00	-.435*	.138	.005
	2.00	1.00	-.071	.077	.628
		3.00	-.506*	.153	.003
	3.00	1.00	.435*	.138	.005
		2.00	.506*	.153	.003

The application of Post-Hoc Tukey test enables identifying the existence of two statistically significant differences in replies, between groups aged up to 30 years (1) and 31-45 years (2), and statistically significant differences in answers between groups aged 31-45 years (2) and 46-65 years (3). It is noted that the group aged 31-45 years (2) gives significantly lower grades, compared to the other two age groups, when responding to Statement 4, whether advice from other consumers reduces the risk of wrong buying decision and increase confidence in the correctness of one's own buying decision. This once again confirms the belief that the oldest consumers have the most manifest need for word-of-mouth communication, so they seek it, i.e., initiate its generation, as it also generates the feeling of confidence and reduces the risk of purchase.

5. CONCLUSIONS AND LIMITATIONS

The conducted research into the phenomenon of word-of-mouth communication on the observed sample has led to the following conclusions:

A large majority of consumers communicate their own experience of products, services, producers and retailers to others through word-of-mouth communication only when

they feel markedly high levels of satisfaction, or when they feel great dissatisfaction with and disappointment in them. Marked satisfaction and dissatisfaction feature as the prime driver of word-of-mouth communication most often in the eldest and youngest consumer segments, and somewhat less in consumers of middle age from early thirties to late forties.

A large majority of consumers will very seldom decide to buy a product or service if there is negative word-of-mouth communication in all three studied countries, and this is especially characteristic of the oldest consumers, whereas in young consumers, positive buying decisions are possible despite negative interpersonal communication.

For a large majority of consumers, the quality of relationships between consumers themselves influences the initiation and intensity of word-of-mouth communication, as the large majority of consumers exchange advice and recommendations interpersonally, with consumers they know and are closely and strongly connected to. Such behaviour is especially characteristic of the oldest consumers, and the least for middle aged consumers, who are somewhere at the peak of their professional carrier, so that they know a large number of people, but not so deeply and complexly.

A large number of consumers believe that word-of-mouth communication reduces the risk of wrong buying decision and increases confidence in one's own choice, where the oldest consumers adhere to this belief the most, unlike the youngest consumers.

As regards the set research hypotheses, H_1 has been partly confirmed, in the sense that there are differences in consumer behaviour depending on their age when it comes to generating word-of-mouth communication, but an unequivocal assumption that a higher age and larger consumer experience also means the activity of generating and disseminating word-of-mouth communication cannot be accepted, as it varies among different age segments.

As for the research hypothesis H_2, it has been fully proved in the sense that the oldest consumers are characterised by the strongest conviction that word-of-mouth communication reduces risk in shopping.

The basic shortcomings of the research could be reduced to the fact that making general conclusion based on a single study is not reliable, regardless of the sample size and instrument structure. An electronic questionnaire and software solutions may cause confusion in consumers, especially when filling in questions on ranks, and another influencing factor is that the largest number of respondents are fully literate, meaning that they are of younger age. Due to the size of the survey – thirty statements – only some of which are resented in the paper, there is a danger of respondent fatigue, where certain questions are answered by inertia, or the provided answers are neutral. The main shortcoming of the sample lies in the ratio between its size – 1513 – and the size of the basic set – almost 14 million inhabitants.

Consumer saturation with the enormous amount of marketing information on a daily basis has resulted in the lost of their confidence in the formal marketing sources of information, as these, besides being overly aggressive, contain solely positive aspects of the business' offer, which is never consistent with the truth. For these reasons, most consumers turn to informal sources of information and focus on other, similar consumers believed to communicate with utmost sincerity their experience with products and services subject to purchase. What additionally stimulates consumers to exchange their experiences with products and services is the ever-present purchase risk – financial, sociological and functional. This is why most consumers seek and initiate word-of-mouth communication where consumers' personal experiences are exchanged, so that they can reduce the risk of wrong purchase decision and increase confidence in one's own choice.

The contemporary consumer is a person initiating the setting, maintenance and advancement of his own social network, through various forms and intensities of relationship within which bilateral communication is realised, with implications on the enterprise's business success.

The current marketing reality necessarily establishes the assumption that consumer behaviour as a whole, especially its central starting point, is the buying decision, an essential social process, which is set not only by the consumer's personal characteristics, but increasingly by the number, quality, frequency and intensity of interactions and relationships between consumers with all market participants, but mostly with other consumers. Word-of-mouth communication among consumers is a form of manifestation of their interconnection, and, as such, directly shapes the behaviour of consumers, their attitudes, opinions, actions and decisions, and changes thereof.

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DETERMINATION OF PRIORITY SERVICE SECTORS IN REPUBLIC OF CROATIA

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ABSTRACT

The purpose of the paper is to present and to explain the method and importance of measuring and determination of the comparative advantages of the national economies. The goal of the paper is to determine the priority service sectors of Republic of Croatia in which the strategy of smart specialization should be implemented, targeted on establishing the strong points and potentials on which the state should focus to create national comparative advantages. The indicator of the revealed comparative advantage (RCA indicator) shows that Republic of Croatia realizes positive values of RCA in all service sectors, and the strongest comparative advantages are in the sector of tourism and services related to travelling, which shows, along with the sector of transportation services, the largest percentage in service export. From the above mentioned it is clear that there is a significant correlation between the sectors with the revealed comparative advantages and its percentage in the structure of the export. Aggregated GL index shows that Republic of Croatia realizes the highest level of specialization in the intra-industrial exchange (exchange of the same services) in ICT sector, which is followed by the transportation services, other business services, and the recreational, cultural and sport services. Other service sectors have the features of the inter-industrial specialization. There is a correlation between the level of specialization and export importance of a particular service sector, since the sector of tourism and travel-related services realizes the largest percentage in the export of all services of Republic of Croatia. After the sector of tourism and travel-related services, the construction services are second on the list of value of indicators of the export competitiveness, followed by the ICT services and the services of transport. From the above mentioned, it can be concluded that the priority service sectors, to which Republic of Croatia should focus because of creation of the national comparative advantage, are the sector of tourism, travel-related sector, transportation sector and sector of ICT services.

KEY WORDS: comparative advantages, export competitiveness, service sectors, Republic of Croatia.

1. INTRODUCTION

The term “service” relates to the wide spectre of the intangible and heterogenous products and activities. One of the most significant achievements of the Urugvay round of the trade negotiations within the General Agreement on Tariffs and Trade, which was taking place from 1986 to 1993, was the organization of the international trade of the services in common multilateral rules. By organization of the World Trade Organization on January 1st 1995, the General Agreement on Trade in Services – GATS, for the first time the service trade was subjected to the discipline of the international law. The methods of providing of the services are defined by the General Agreement on Trade in Services, by emphasizing the four basic models of the service providing, and these are: (Mlikotin-Tomić, 1999):

1. providing the services across the border,
2. service consummation in the foreign countries,
3. provider provides services directly on the teritorry of the other member country,
4. the services are provided with the help of temporary employed person.

The service sector is of the exceptional importance for growth and reduction of the poverty in the developing countries. This influence is manifested directly, since the services are a substantial, if not the largest percentage of these economies, but also indirectly, because the services like the finances, communications, transport, education and health, have impact on other sectors of economy and the productivity of the workers. In many countries, some of the fastest growing sectors of service are telecommunication, financial and transport services.

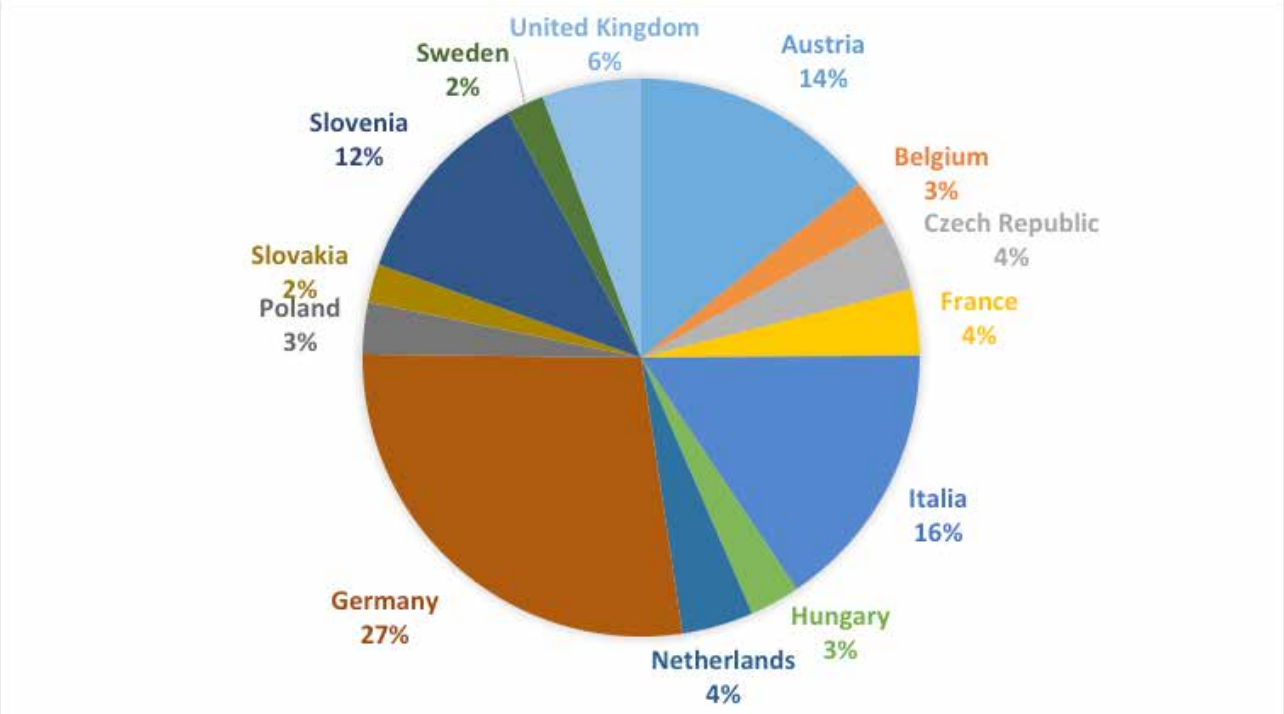
The Croatian economy is service oriented, and according to the data of the World Bank (2013), the largest percentage of the bruto national product of Republic of Croatia (68,97 % of BNP in year 2013) is related to services. The balance of the trade service exchange of Republic of Croatia is positive (total volume of the exported services is larger than the total volume of the imported services), while, on the other side, the balance of the trade goods is deficitary. The second indicator which points to the importance of services in Croatian economy is the level of the Croatian export related to the services (9.3 million of Euros in 2012). In 2013, the service export participated with 51.35% in the total export of Republic of Croatia. Nevertheless, the service export is not treated as the incentive of growth and development. Republic of Croatia exports more than 2/3 of the services into other member countries of EU. Because of that, the bilateral service trade of Republic of Croatia with other countries of EU will be the subject of the analysis of this paper.

The article is divided into five individual chapters. After the introduction, there is the review of the most important partner countries to the Republic of Croatia in the service export, and the analysis of the revealed comparative advantages of the service sectors of the Republic of Croatia. The third chapter analyses the level of specialization of the service sectors of Republic of Croatia by the implementation of the aggregated GL index, while the fourth chapter analyzes the export competitiveness of the service sector of Republic of Croatia. The last chapter provides the basic conclusions of the paper.

2. REVEALED COMPARATIVE ADVANTAGES OF THE SERVICE SECTORS OF REPUBLIC OF CROATIA

Republic of Croatia is significantly related in trade with other member countries of the European Union, and according to the data of the International Trade Centre in 2012, as much as 77,71 % of the service export from Republic of Croatia was related to the member countries of this regional integration. From Graph 1, it is visible that the service export in the period between 2004 and 2012 was the highest to Germany (27% of the total service export), then Italy (16%), Austria (14%) and Slovenia (12%).

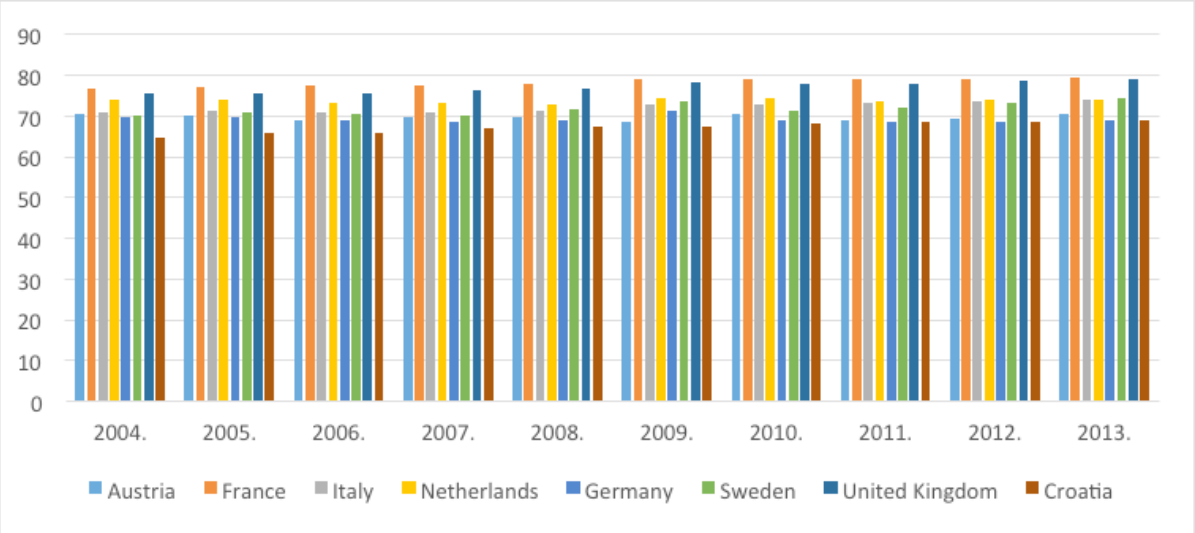
Graph 1. Most important partner countries in service export of the Republic of Croatia in period from 2004 to 2012, in %



Source: author's calculations based on International Trade Centre [online]. Available at: http://www.trademap.org/Country_SelServiceCountry_TS.aspx [11 January 2015]

In the period from 1990 to 2013, Republic of Croatia has shown the continuous trend of the increase of the share of services in BNP, with the exception of the war period from 1991 to 1994, when there was a slight decrease of this share (graph 2). In 2013, Republic of Croatia has realized the similar share of the services in BNP (68,97 %) as Germany (69,02 %) and Austria (70,50 %). In relation to other reviewed member countries of EU, France has the largest percentage of services in BNP throughout the whole reviewed period (in average, 78.29%), followed by United Kingdom (77,16 %), Netherlands (73,84 %), Italy (72,23 %) and Sweden (71,85 %).

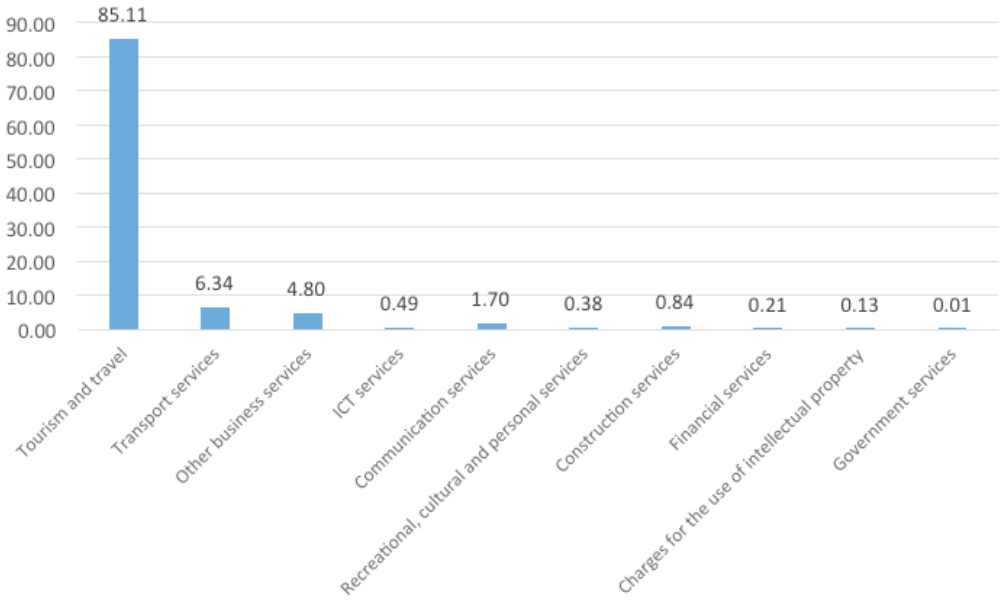
Graph 2. Share of the services in the bruto national product in the most important partner countries in the service export of Republic of Croatia, in period from 2004 to 2013, in %



Source: author's calculations based on Eurostat [online]. Available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/The_EU_in_the_world_-_international_trade [05 December 2014]

Viewed according to the sectors in period between 2004 and 2013, in service export of Republic of Croatia, the most substantial share is tourism sector and travel-related services (84,90 % of the total services export), and the rest is related to the transport services (6,33 %), other business services (4,78 %), communication services (1,69 %), construction services (0,84 %) etc.

Graph 3. Service export from Republic of Croatia according to sectors, in period from 2004 to 2013, in %



Source: author's calculations based on International Trade Centre [online]. Available at: http://www.trademap.org/Country_SelServiceCountry_TS.aspx [11 January 2015]

This section of the paper asks whether the increased opennes and volume of the service exchange causes the expected positive change of the exchange structure. Positive change of the structure of international exchange means the change of the comparative advantages toward the services of greater additional value, as well as the higher level of specialization (Buturac, 2008). The following part analyzes the question of the change of the comparative advantages, while the problem of specialization is analyzed in the next chapter.

The usage of the indicators of the revealed comparative advantage – RCA, defined by B. Balassa in 1965, will determine the comparative advantages of the service sectors. Many researches were conducted with the purpose of development of the methodology of the calculation and implementation of RCA indicators (Aquino, 1981; Balassa, 1965; Lafay, 1992; Laursen, 1998). The concept of RCA indicators is organized in such way that the country realizes the comparative advantages in those products and services in which the value of the export is

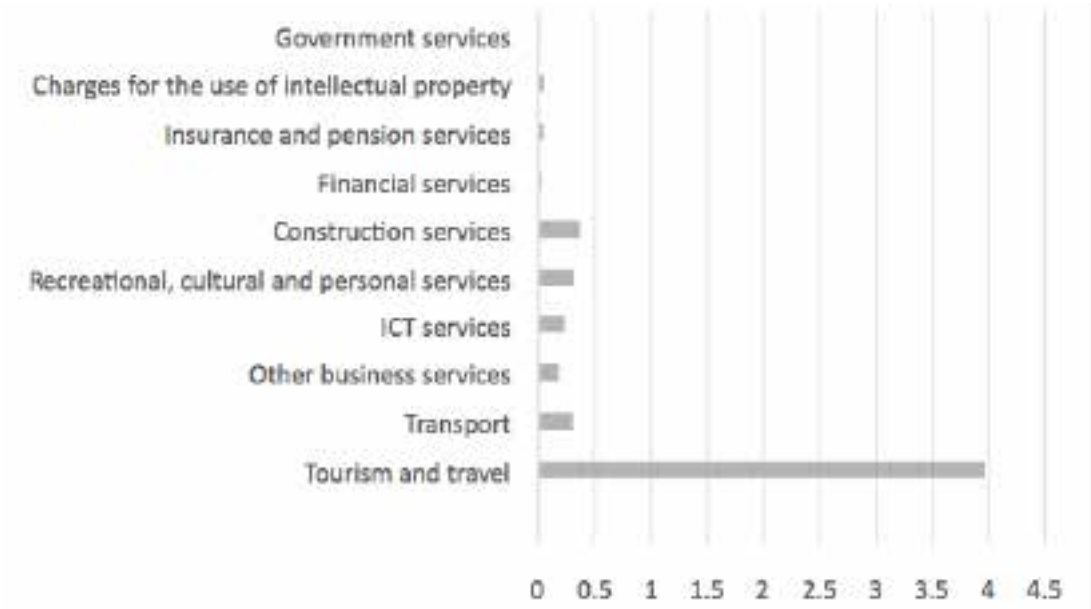
larger than the value of the import. The indicator of the revealed comparative advantage of an individual service sector in the total export is calculated in following manner:

$$RCA = \frac{\frac{X_{ij}}{X_{is}}}{\frac{X_{nj}}{X_{ns}}}$$

in which X is the value of the export services, *i* is the country which exports (Republic of Croatia), *j* represents the individual service sector, *n* represents other member countries of European Union (EU-27), and *s* represents all service sectors together. The above mentioned indicator is also called "original index of the revealed comparative advantages" since all variables in the formula are related to the export (Brkić and Balić, 2014). Positive value of RCA indicators for particular sector of the services shows that the country has revealed comparative advantages in the exchange of that service. Conversely, the negative indicator shows that the country does not have comparative advantages.

The indicator of revealed comparative advantage shows that Republic of Croatia realizes positive values of RCA indicators in all service sectors, and the most significant comparative advantages are those in the sector of tourism and travel-related services, which has, together with the sector of transport services, the largest share in the service export. From the above mentioned, it is obvious that there is a significant correlation between the sectors with revealed comparative advantages and their share in the export structure.

Graph 4. RCA indicator of the service sectors of Republic of Croatia in period from 2004 to 2013



Source: author's calculations.

3. SPECIALIZATION OF THE SERVICE SECTORS OF REPUBLIC OF CROATIA

By implementation of the aggregated GL index, developed and implemented by Grubel and Lyod in 1975, we will analyze the level of specialization in intra-industrial exchange, and establish the correlation between the level of specialization and the export significance of a particular service sector. Intra-industry exchange relates to the simultaneous export and import of the same services. With the opennes of the economy, the specialization could be an important indicator of the level of economic integrations (Buturac, 2008).

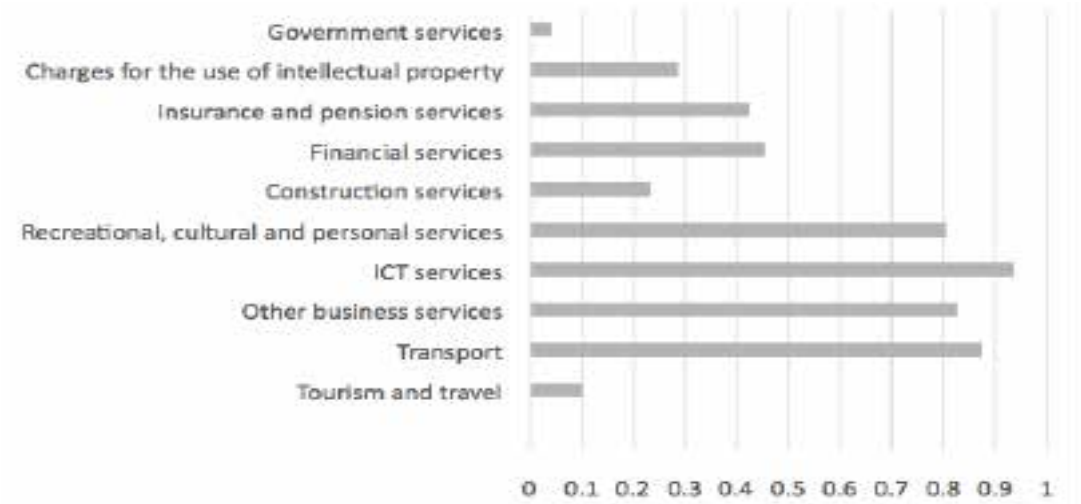
Aggregated GL index is calculated according to the following formula:

$$GL = 1 - \frac{|x - m|}{x + m}$$

in which x is the value of the export of services of a particular sector, and m the value of the import of the services of a particular sector. The value of the index can be found within the scope from 0 to 1; the larger value of the index points to the higher level of specialization in intra-industrial exchange.

The empirical calculations of the index of specialization of the service sectors of Republic of Croatia are shown in the Graph 5. The value of the aggregated GL index points to the fact that Republic of Croatia realized the highest level of specialization in intra-industry exchange (exchange of same services) in ICT sector; it is followed by the transportation services, other business services, and recreational, cultural and sport services. Other service sectors have features of inter-industrial specialization. We can conclude with the fact that the service sectors which have extremely emphasized specialization in intra-industrial exchange do not have the significant share in the structure of the service export in Republic of Croatia. In other words, there is no correlation between the level of specialization and the export significance of a particular service sector.

Graph 5. GL index of the service sectors of Republic of Croatia in period from 2004 to 2013



Source: Authors' calculations

4. EXPORT COMPETITIVENESS OF THE SERVICE SECTORS OF REPUBLIC OF CROATIA

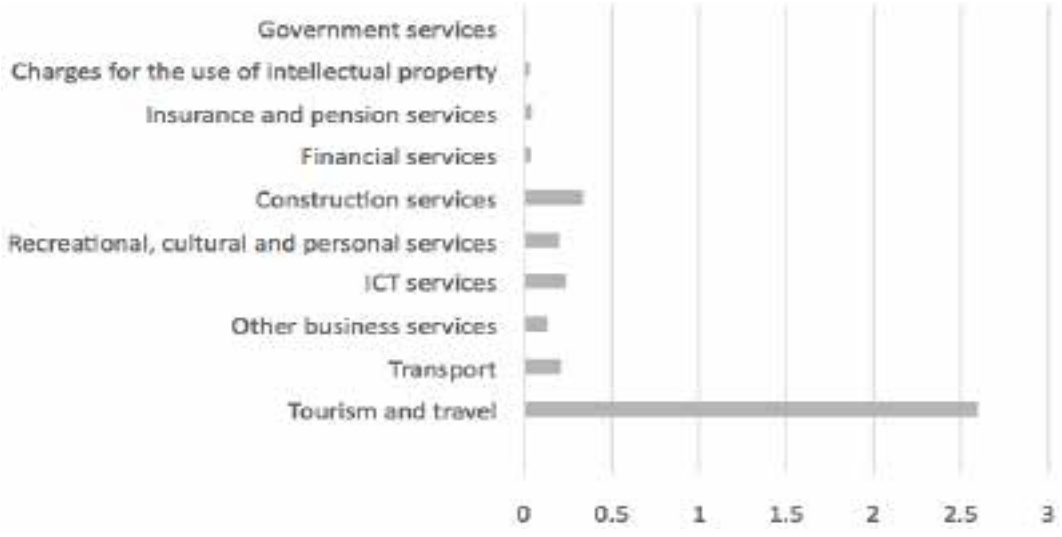
The competitiveness has become a natural law of the modern economics (Kitson, Martin and Tyler, 2004). Export competitiveness is often mentioned as the necessary item in the solution of the economical problems (Stojanov, Bezić, Galović, 2011). The original competitiveness will be analyzed through the implementation of the indicators of the original competitiveness, which represents the ratio of the share of export of the particular service sector *i* into the observed country *c* and the total import of that service sector by the observed country *c,* according to the formula:

$$Ic_i\,(a, c) = \frac{EX_i\,(a, c)}{\Sigma_{i=1}^{n}\, IM_i\,(c)} * 100$$

in which $EX_i\,(a, c)$ is the export of the service sector *i* of country *a* (Republic of Croatia) into the country *c* (other European Union countries), and $\Sigma_{i=1}^{n}\, IM_i\,(c)$ represents the total import of the services of the sector *i* from the country *c*. The indicator of the export competitiveness will provide the insight into the trends of the change of the export competitiveness. If the indicator of the export competitiveness is more than 1, the increasing export competitiveness is present. Contrary to that, realized value of the indicator less than 1 implie the negative trend of the export competitiveness.

From this calculation of the indicators of export competitiveness, it can be concluded that the sector of tourism and services related to travel has shown growing export competitiveness, since it is the only of the rest of analyzed service sectors which has realized the value of the indicator of export competitiveness higher than 1. After the tourism sector and travel-related services, the construction services are on second place by the value of indicator of the export competitiveness, followed by the ICT services, and transport services, but all the above mentioned service sectors realize the value of the indicator of export competitiveness lower than 1, which points to the negative trend of the export competitiveness.

Graph 6. Indicator of the export competitiveness of the service sectors of Republic of Croatia in the period from 2004 to 2013



Source: author's calculations.

5. CONCLUSION

For small economies like Croatian, the export competitiveness is of extreme importance for the sustainable growth and vitality of the economic activity. The export enables the domestic production to achieve the effects of the economy of volume. Orientation toward technology, inovations, development and research has a visible effect on the increase of the level of competitiveness. The economy of Republic of Croatia is service oriented – most of the bruto national product consists of the services, and more than half of Croatian export is service related. Nevertheless, the export of the services is not treated as the incentive for growth and development. The most important export-import partners of Republic of Croatia in the service export are other member countries of European Union, especially Germany, Italy, Austria and Slovenia.

Analysis of the revealed comparative advantages, specialization and export competitiveness has shown that the most prominent comparative advantages are realized by the sector of tourism and travel-related services, the highest level of specialization in intra-industrial exchange has the ICT sector, and the growing export competitiveness the tourism sector and travel-related sector. From all the above mentioned, we can conclude that the strategy of smart specialization should be implemented in the tourism sector, travel-related services, ICT sector and transportation service sector, and that the state should focus on the above mentioned service sectors to create national comparative advantages.

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PERCEPTION AND INTENTION FOR BUYING PRIVATE LABEL IN PARTICULAR PRODUCT CATEGORIES AMONG MACEDONIAN CONSUMERS

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ABSTRACT

Private labels are usually perceived as cheap substitutes compared to national brands. Though, in recent years private labels are becoming widely prevalent and successful in more product categories. An empirical research was conducted in order to investigate consumers' perceptions on private labels and their intentions to purchase private labels in various product categories. Additional to descriptive statistics, Kruskal Wallis test was applied for analyzing the differences in consumers' perceptions and intentions on private labels, regarding their demographic characteristics, i.e. gender, education and income level.

The perceptions and the shopping attitudes of the consumer in the Republic of Macedonia about private labels versus national brands have insignificant influence on buying decision making. Therefore, the paper provides relevant information for marketing professionals, retailers and scholars regarding the factors influencing perceptions and buying intentions of the private labels in different product categories.

KEY WORDS: private label, perception, product category.

INTRODUCTION

Perceptions about private-label brands are favorable around the world, and intention for buying private labels is more common in commodity driven, high-purchase categories and those where consumers perceive little differentiation. Private label products are generally brands owned by retailers, wholesalers, or distributores and are sold exclusively and privately in their own stores (Bushman, 1993; Sethuraman and Cole 1999). Perceptions about private labels are overwhelmingly adorable, almost three-quarters of global respondents (71%) say private-label quality has improved over time. Private label is most developed in Europe, particularly in the Western markets. Private labels contribute up to 45% of the brand share in the developed countries. Switzerland has the highest private-label share (in the region and around the world) at 45%, followed closely by the U.K. and Spain at 41% each. Private label is less developed in eastern and central Europe, where share varies greatly from a high of 24% in Poland to a low of 5% in Ukraine (Nielsen, 2014). Private labels have higher unit market share than the top national brands in more than one third of the categories (Quelch and Harding, 1996).

Though it has no official data for the private label share in the Republic of Macedonia, the concept of private labels is accepted and has become an important part of the retail chains strategy.

Share of private label brands have been growing rapidly in recent years due to their advantages. Price is important to most of the consumers and is the primary driver ofconsumers' purchase intentions for private label. Many authors pointed out that the quality is more important in determining private label success than lower price (Hoch and Banerji, 1993; Sethuraman, 1992). The inappropriate private label management that focuses excessively on price, compromising product quality, will have a negative impact on a large number of product categories (Horvat, 2013). Among retail chains, one obvious reason for their popularity and growth is their potential to increase store loyalty, chain profitability, control over shelf space, improving bargaining power over manufacturers and getting better margins for manufacturers' brands

(Richardson et al., 1996; Jorge, 2004; Chakravarthi and Ronald, 1998).

Besides main advantages of private labels, consumers always have a perceptual bias towards private labels for most of the product categories and give manufacturers' brands better quality assessment without considering the real difference (Paul et al., 1994). At the same time, retailers continuously seek to improve negative customer perceptions of quality as major roadblock to increased volume. Efforts to improve quality perceptions of private labels might be accomplished by upgrading the tangible quality of the product, improving the packaging, innovation, and educating consumers about the how quality is built into the product (Garretson et al., 2002).

LITERATURE REVIEW

The perception of private label as offerings not capable of delivering any other benefits than price has been changed. Private labels are evolving from being mere substitutes to major threats for manufacturers' brands (Burt and Davis, 1999). Recently, private labels are becoming widely prevalent and successful in apparels, staple food, bakery, biscuits, chocolates and beverages categories and also into some unconventional categories like home appliances too.

The influence of demographic variables on perception and intention of buying private labels was the main focus of this study.

Most studies examining the impact of demographical variables on private label buying were conducted in the 1960s and 1970s. Despite a considerable number of researches for private label issues, findings regarding demographic characteristics are inconclusive. On one side, in one of the earliest published studies it was found that buyers of private label are older, better educated with lower incomes compared to buyers of manufacturer brand (Frank and Boyd, 1965). On the other hand, Coe (1971) and Murphy (1978) found that private label buyers belong to higher income classes.

The studies that examine the demographic influences on perception and buying intention in various categories of private label are limited. The main issue important to both retailers and marketers is whether the effect of demographic groups influences attitudes towards private labels. A long period of time there are no studies exploring the impact of demographic variables on private brand proneness. Richardson et al.(1996) tested the effect of four variables: income, education, age of the primary grocery shopper of the household and family size. They contend that the demographic status of respondents affects the propensity to purchase private labels. However, Baltas and Doyle (1998) conclude that many of the demographic findings into private label purchasing are mixed, unclear or outdated.

Several studies examine the effect of educational achievement on private label purchasing. Highly educated consumers have more opportunity to earn a greater income and are less dependent on the brand name as an extrinsic cue (Murphy & Laczniak, 1979). Some researchers also show that private label buyers with lower formal education are more likely to purchase national brands (Richardson et al., 1996). Other researchers argue that well educated consumers are more confident in their evaluative ability of products and that education is positively related to private label performance. Glynn and Chen (2009) proves that the relationship between education and private label purchase is significantly negative. Consumers who have tertiary-level education are more likely to choose higher priced national brands than people without such qualifications. This study suggests that people with higher educational qualifications are less prone to buy private label products. In contrast, Lybeck et al. (2006) find that better educated consumers have intention to buy private labels. Richardson et al. (1996) suggests that larger households, who have fewer financial resources than smaller households, are more likely to purchase private labels products.

Hoch (1996) suggests that household income has a negative relationship with private label purchase. The households with higher income have fewer financial constraints and show less price concern and less favorable attitude to private label, which reduces private label purchase incidence (Ailawadi et al., 2001; Burton et al., 1998). Glynn and Chen (2009) indicated that households with higher incomes are less likely to buy private label products. They stated that gender, on the other hand, has no statististicaly significant differences concerning private label usage. Other demographic variables, such as, income, household size, marital status and profession, were not significantly related to how inclined the respondents were to buying private label. However Lybeck et al. (2006) find that middle–aged consumers are more likely to buy store brands. Contrary, Burton et al. (1998) confirm that the differences in gender and age are non-significant and have no influence on perceptions. Analyses of variance results indicate significant differences between levels of education and family income and private label attitude. The directional patterns of relationships for these demographic variables have been reflected in the percentages of private label purchases (e.g., higher education and lower incomes associated with higher purchase percentages. Other authors stated that younger consumers and females are willing to pay larger price premiums than older consumers (Sethuraman and Cole, 1997). Beneke, (2010) found that greater degree of brand loyalty was observed in females and less affluent consumers.

Most of the researches investigating differences in private label product categories were focused on factors relevant for manufacturer and retailer (Hoch and Banerji, 1993; Sethuraman, 1992). Batra and Sinha (2000) investigate consumer level perceptions of intercategory differences. They pointed out the necessity to include more consumer–level variables such as demographic determinants in their future research. Other studies confirm no direct effect of demographic variables on the purchase of private verus manufacturers' brand (Liu and Wang, 2008). Beneke (2010)

stated that demographic variables are largely ineffective in determining an individual's propensity to buy private label brands.

Contrary, previous studies confirmed that consumers' propensity to purchase private labels depends on certain demographic factors, such as household income, age and education.

As some of the research on demographic private label effects is contradictory, we next examine the influence of household income, education, and gender on perception and intention of buying private labels. On the basis of the forgoing arguments we propose the following hypotheses:

H1: There are gender differences concerning respondents' private label perceptions.

H2: There are differences among respondents' perceptions on private labels, regarding their level of education.

H3: There are differences among respondents' perceptions on private labels, regarding their income level.

Additionally, we examine whether the different demographic determinants impact purchasing preferences for private label brands across thirteen different product categories. Besides the fact that most of the categories were food related (flour, chocolate, pasta, snack items, jam and honey, frozen foods, dairy products, beverages), other categories were also included such as personal care products, house-hold cleaning products, pet supplies, and organic products.

Hence, we hypothesize that:

H4: There are gender differences concerning respondents' intentions on private labels.

H5: There are differences among respondents' intentions on private labels, regarding their level of education.

H6: There are differences among respondents' intentions on private labels, regarding their income level.

METHODOLOGY

The empirical data of this study was collected by using a structured questionnaire, consisted of three sections: demographic questions (gender, education, income etc.); statements assessing respondents' perceptions regarding different private label attributes and statements measuring respondents' intentions on buying private labels in different product categories. Respondents were asked to express their level of agreement related to the provided statements on a five-point Likert scale (1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree and 5= strongly agree). The statements assessing respondents' perceptions and intentions related to private labels were adapted from the previously referenced literature (Senthilvelkumar and Jawahar, 2013). The "perception" section comprised 7 attributes of private labels (quality, value, pack size, variety, attractiveness, consumer needs fulfillment and additional benefits); while "intention" section included 13 product categories (mainly food products categories).

A non-probability sampling method was used, conventionally distributing the questionnaire to 512 respondents and 464 responses were received. After conducting the data screening procedure, 383 valid responses were remained (74,8% response rate). The sample characteristics are presented in table 1.

Table 1: Sample structure

Gender (%)	
Female	63.2
Male	36.8
Education (%)	
No education	0.3
Elementary education	4.4
High school	42.3
University degree	44.4
Master/PhD	8.6
Income (%)	
< 10.000 denars	6.8
10.001-20.000 denars	19.8
20.001-30.000 denars	26.9
30.001- 40.000 denars	16.4
40.001- 50.000 denars	17.2
> 50.001 denars	12.8

Source: Authors' calculations

Most of the respondents are female (63.2%), while regarding the level of education, most of them are with university degree (44.4%) or high school (42.3%). Concerning the income level, more than quarter of the respondents (26.9%) belongs to the category 20.001-30.000 denars, i.e. at the level of the average wage in Macedonia.

The obtained data were further analyzed in SPSS v20. Besides the descriptive statistics, Kruskal Wallis test was used in order to explore differences in perceptions and intentions related to private labels, regarding gender, education and income level. Kruskal Wallis test was applied since the data distribution was not proved to be normal.

Results and Discussions

The descriptive statistics of perception and intention statements are presented in table 2.

Table 2: Descriptive statistics

	Mean	Std. Deviation
Private labels offer better product quality than national brands	2.7232	.98239
Private labels offer greater value for money than national brands	3.3368	1.08482
Private labels have more convenient pack sizes than national brands	3.4738	1.07126
Private labels offer better product variety than national brands	2.4595	1.16350
The packaging of private labels are more attractive than that of national brands	2.4230	1.14347
Private labels take more care than national brands in meeting consumer needs squarely	3.1358	1.00384
Private labels offer more additional benefits for the consumers like discount, extra quantity and free gifts than national brands	3.7827	1.08069
I prefer to buy private labels over national brands in the category of staple food products like food grains, flour and pulses.	3.2388	1.14163
I prefer to buy private labels over national brands in the category of biscuits and chocolates.	2.8845	1.19969
I prefer to buy private labels over national brands in the category of snack/savory items.	3.0052	1.16528
I prefer to buy private labels over national brands in the preparatory food categories like noodles, pasta, porridge and vermicelli.	3.0919	1.18298
I prefer to buy private labels over national brands in the category of sauce/ketchup, jam and honey.	3.0814	1.18152
I prefer private labels over national brands in the category of personal care products like soap, toothpaste and skin cream.	2.3789	1.24285
I prefer private labels over national brands in the category of personal care products like detergent soap/powder and floor cleaning.	2.9003	1.15190
I prefer private labels over national brands in the category of pet supplies	2.5914	1.21079
I prefer private labels over national brands in the category of organic products	2.6746	1.15045
I prefer private labels over national brands in the category of frozen foods	2.8549	1.15815
I prefer private labels over national brands in the category of cannned food	2.9710	1.11113
I prefer private labels over national brands in the category of dairy foods	2.8351	1.26388
I prefer private labels over national brands in the category of Beverages	2.7063	1.19726

Source: Authors' calculations

Regarding the average scores of perceptions on different private label attributes, it could be notified that the highest level of agreement (3.78) is expressed concerning the additional benefits (discounts, extra quantity, presents etc.) that private labels provide comparing to national brands. The lowest average values are observed regarding attractiveness (2.42) and variety (2.45) of private labels comparing to national brands. Generally, the respondents are neutral, i.e. they express neither agreement nor disagreement about the statements related to their perceptions on private label attributes (3.05 in average).

The average respondents' intention to buy private labels (2.86) is even lower than their perceptions' average. Regarding different product categories, respondents express the highest level of intention to buy private labels in basic food product category (flour, grains etc.) (3.24). Respondents' intentions are lowest for buying private labels in the personal care product category (soaps, toothpaste, skin cream etc.) (2.38); where the perceived risk is higher.

In order to test the proposed hypotheses regarding the differences among perceptions and intentions of respondents with different demographic characteristics (gender, education and income), Kruskal Wallis test was applied. The results are presented and discussed below.

Since it is observed that $p=0.192$, i.e. $p>0.05$, the H1 (There are gender differences concerning respondents' private label perceptions) is rejected. Therefore, it could be assumed that there are no differences in perceptions on private labels between males and females. In order to conduct more in-depth analyses regarding different private label attributes, the Kruskal Wallis test was performed for testing differences between males' and females' perceptions on separate private label attributes (Table 3).

Table 3: Gender differences in perceptions on private label attributes

	Private labels offer better product quality than national brands	Private labels offer greater value for money than national brands	Private labels have more convenient pack sizes than national brands	Private labels offer better product variety than national brands	The packaging of private labels are more attractive than that of national brands	Private labels take more care than national brands in meeting consumer needs squarely	Private labels offer more additional benefits for the consumers like discount, extra quantity and free gifts than national brands
Chi-Square	.009	5.702	.021	.855	1.639	.143	.001
Df	1	1	1	1	1	1	1
Asymp. Sig.	.926	.017	.885	.355	.200	.705	.969

Source: Authors' calculations

The level of significance is observed to be p<0.05 on differences between males' and females' perceptions related to value private labels provide comparing to the national brands. Namely, males perceive higher level of value of private labels (3.48) compared to females (3.25). Regarding other private label attributes, there are no significant differences between males' and females' perceptions.

H4 (There are gender differences concerning respondents' intentions on private labels)) is not confirmed (p=0.497), i.e. there are no differences between males' and females' intentions to buy private labels. Further, Kruskal Wallis test was performed for testing differences between males' and females' intentions on private labels in different product categories (Table 4).

Table 4: Gender differences in intentions on private labels in different product categories

	Staple food products like food grains, flour and pulses.	Biscuits and chocolates.	Snack/ savory items.	Noodles, pasta, porridge and vermicelli.	Sauce/ ketchup, jam and honey.	Soap, toothpaste and skin cream.	Detergent soap/ powder and floor cleaning.	Pet supplies	Organic products	Frozen foods	Canned food	Dairy foods	Beverages
Chi-Square	1.690	1.335	.860	.398	.005	.035	.055	.623	.215	3.263	11.545	.109	.809
Df	1	1	1	1	1	1	1	1	1	1	1	1	1
Asymp. Sig.	.194	.248	.354	.528	.942	.851	.815	.430	.643	.071	.001	.742	.369

Source: Authors' calculations

The differences between males' and females' intentions on buying private labels are observed to be significant (p<0.05) only in the canned food product category. Namely, males express higher level of intentions for buying canned food (3.24) with a private label than females do (2.82). In other product categories, there are no significant differences in males' and females' intentions on buying private labels.

The obtained results (p=0.279) indicate that H2 that there are differences among respondents' perceptions on private labels, regarding their level of education should be rejected. Therefore, no differences were found in perceptions on private label among the respondents with different education level. In order to conduct more in-depth analyses regarding different private label attributes, the Kruskal Wallis test was performed for testing differences in perceptions on separate private label attributes among respondents with different education levels (Table 5).

Table 5: Respondents' differences in perceptions on private label attributes, regarding education level

	Private labels offer better product quality than national brands	Private labels offer greater value for money than national brands	Private labels have more convenient pack sizes than national brands	Private labels offer better product variety than national brands	The packaging of private labels are more attractive than that of national brands	Private labels take more care than national brands in meeting consumer needs squarely	Private labels offer more additional benefits for the consumers like discount, extra quantity and free gifts than national brands
Chi-Square	4.563	2.095	2.661	2.399	6.693	7.375	6.028
Df	4	4	4	4	4	4	4
Asymp. Sig.	.335	.718	.616	.663	.153	.117	.197

Source: Authors' calculations

No differences were found in perceptions of private labels among respondents with different education level, neither on the attribute level.

H5 (There are differences among respondents' intentions on private labels, regarding their level of education) is rejected (p=0.917) and it could be concluded that intentions on buying private labels are not significantly different among respondents with different education level. Further, the differences in respondents' intentions were explored on product category level.

Table 6: Respondents' differences in intentions on private label in different product categories, regarding education level

	Food grains, flour and pulses.	Biscuits and chocolates.	Snack/ savory items.	Noodles, pasta, porridge and vermicelli.	Sauce/ ketchup, jam and honey.	Soap, toothpaste and skin cream.	Detergent soap/ powder and floor cleaning.	Supplies	Organic products	Frozen foods	Canned food	Dairy foods	Beverages
Chi-Square	3.320	3.528	8.236	6.349	3.408	1.471	4.895	8.205	2.271	5.965	.103	1.096	3.617
df	4	4	4	4	4	4	4	4	4	4	4	4	4
Asymp. Sig.	.506	.474	.083	.175	.492	.832	.298	.084	.686	.202	.999	.895	.460

Source: Authors' calculations

No differences were confirmed in respondents' intentions on buying private labels (regarding their level of education) neither on the product category level (Table 6).

As regarding the other demographic characteristics, the income level of respondents was not confirmed to influence their perceptions on private labels (p=0.182), i.e H3 is rejected. On attribute level, significant differences were found in perceptions of the package attractiveness and product quality of private labels among respondents belonging to different income groups (Table 7). Namely, as income level increases, respondents' perceptions on private labels package attractiveness compared to national brands significantly decreases. Additionally, respondents in the lowest income group express the most preferable perceptions regarding product quality of private labels relative to national brands' quality.

Table 7: Respondents' differences in intentions on private label attributes, regarding income level

	Private labels offer better product quality than national brands	Private labels offer greater value for money than national brands	Private labels have more convenient pack sizes than national brands	Private labels offer better product variety than national brands	The packaging of private labels are more attractive than that of national brands	Private labels take more care than national brands in meeting consumer needs squarely	Private labels offer more additional benefits for the consumers like discount, extra quantity and free gifts than national brands
Chi-Square	11.069	10.100	1.253	8.545	19.559	6.870	5.706
Df	5	5	5	5	5	5	5
Asymp. Sig.	.050	.072	.940	.129	.002	.230	.336

Source: Authors' calculations

H6 that there are differences among respondents' intentions on private labels, regarding their income level is not confirmed, i.e. respondents' income level does not influence their intentions on buying private labels. In the same line are the results observed in the additional analysis on product category level. That is, respondents' intentions on private labels in different product categories do not differ significantly, regarding their income level (Table 8).

Table 8: Respondents' differences in intentions on private label in different product categories, regarding income level

	Food grains, flour and pulses.	Biscuits and chocolates.	Snack/ savory items.	Noodles, pasta, porridge and vermicelli.	Sauce/ ketchup, jam and honey.	Soap, toothpaste and skin cream.	Detergent soap/ powder and floor cleaning.	Pet supplies	Organic products	Frozen foods	Canned food	Dairy foods	Beverages
Chi-Square	5.999	5.497	3.421	1.208	5.923	8.585	3.290	4.714	2.994	3.843	3.311	1.482	10.214
Df	5	5	5	5	5	5	5	5	5	5	5	5	5
Asymp. Sig.	.306	.358	.635	.944	.314	.127	.655	.452	.701	.572	.652	.915	.069

Source: Authors' calculations

CONCLUSION

Despite tremendous interest in the current role of private label by retailers, distributors, and national brand manufacturers, there has been little scholarly research that has examined the demographic variables. The study examines the consumers' perceptions and intentions to purchase private labels for various product categories. Kruskal Wallis test was performed to check whether there were significant differences with respect to demographic variables on perception and buying criteria. This research confirms that income, education and gender are not of high importance in identifying perception on private label attributes and intentions on buying private labels in different product categories. The survey confirmed that there are no differences in perceptions on private labels between males and females. Some clear differences were found between males' and females' perceptions related to value private labels provide comparing to the national brands. Namely, males perceive higher level of value of private labels compared to females. The differences between males' and females' intentions on buying private labels are observed to be significant only in onw product category, the canned food. No differences were found in perceptions of private labels among respondents with different education level on the attribute level neither on the intention on buying private labels on the product category level.

As regarding the other demographic characteristics, the income level of respondents was not confirmed to influence their perceptions on private labels. On attribute

level, significant differences were found in perceptions of the package attractiveness and product quality of private labels among respondents belonging to different income groups. Consequently, as income level increases, respondents' perceptions on private labels package attractiveness compared to national brands significantly decreases. Also, respondents in the lowest income group highly evaluate product quality of private labels relative to national brands' quality. Respondents' intentions on private labels in different product categories do not differ significantly, regarding their income level.

Generally, education, income and gender do not influence private brand proneness, subsequently there are no differences in private label attitudes across demographic variables. The findings in this study would have academic and managerial relevance. The survey examining the relationship between the demographic determinants and perception and intention of buying private labels will be useful for retailers in making appropriate targeting and positioning decisions. In the end, it is important to point at the limitations of this study that may affect the generalizability of the findings. Because of the localised nature of this study, further research is needed using a larger, cross - cultural and more heterogeneous sample.

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CONSCIENTIOUSNESS AND INTRINSIC MOTIVATION AS PREDICTORS OF PERCEIVED LEARNING AND ACADEMIC ACHIEVEMENT

UDK 378:159.9 / JEL A21 ; I21 / ORIGINAL SCIENTIFIC PAPER

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ABSTRACT

This paper aims to relate conscientiousness, intrinsic motivation and perceived learning, and its direct and indirect relationships with academic achievement. An empirical study was undertaken, involving a representative sample of 1986 Portuguese high school students. A structural model reveals that conscientiousness directly and positively influences intrinsic motivation, perceived learning and academic achievement. In turn, intrinsic motivation directly and positively influences perceived learning and academic achievement. Corroborating previous studies, these findings suggest that personal factors are essential to improve student´s learning outcomes, namely academic achievement. Recommendations for teachers and school managers are addressed.

KEY WORDS: academic achievement, perceived learning, conscientiousness, intrinsic motivation.

1. INTRODUCTION

Understanding the factors that influence academic achievement is a major concern of educational psychologists, because it has important implications for education improvement. The use of multiple outcomes variables is recommended in order to ensure that several goals and dimensions of learning are represented (Marks, 2000).

In this study we'll consider two learning outcomes: perceived learning, which can be defined as students' positive thoughts and feelings towards learning in class, and academic achievement, described as the grades obtained by the students.

There are several factors that may explain the learning outcomes, namely personality and motivation. A review of recent empirical studies on the relationship between Big Five personality dimensions (Costa & McCrae, 1992a) and academic achievement found some consistent results. A meta-analysis showed that conscientiousness is strongly and consistently associated with academic achievement (O´Connor & Paunonen, 2007). Notably, the literature indicates that the narrow personality traits or facets of this factor "are generally stronger predictors of academic performance than are the Big Five personality factors themselves" (p. 970). Also the positive correlation between conscientiousness and academic performance is commonly interpreted in terms of motivation (p. 987).

Motivation is a broad construct that can be addressed by different theories. Based on self-determination theory (Deci & Ryan, 1985), several studies highlight the importance of intrinsic motivation in the quality of learning. These authors consider that human behavior intrinsically motivated may be defined as the behavior the individual will choose in order to feel competent and self-determined in his relationship with the environment. This leads the subject to seek and select situations that allow him to use abilities, even if it requires a bigger effort.

Within this scope, conscientiousness and intrinsic motivation are considered crucial to understand the quality and success of student learning. Thus, this study aims to relate conscientiousness, intrinsic motivation and perceived learning, and its direct and indirect relationships with academic achievement.

2. LITERATURE REVIEW

2.1. Conscientiousness

Conscientiousness is one of the Big Five Personality factors (Costa & McCrae, 1992a), a dominant conceptualization of personality structure in the current literature. It is the most important of the Big Five predictors associated to the learning performance (Raad & Schouwenburg, 1996; Richardson & Abraham, 2009), and also the "best predictor across a broad spectrum of academic achievement measures and explains five times as much in GPA [grade point average] as does intelligence" (Kappe & Van der Flier, 2012, p. 605).

This factor assesses the degree of organization, persistence and motivation for a behavior oriented towards a goal. It contrasts persons who are reliable with those who are careless (Costa & McCrae, 1992b).

It is an aspect of "what once called *character*; high C scorers are scrupulous, punctual, and reliable. Low scorers are not necessarily lacking in moral principles, but they are less exacting in applying them, just they are more lackadaisical in working toward their goals" (Costa & McCrae, 1992a, p. 16).

Conscientiousness facets are: competence (C1); order (C2); dutifulness (C3); achievement striving (C4), self-discipline (C5) e deliberation (C6). The facets achievement-striving, self-discipline and dutifulness have been "the strongest and most consistent predictors of academic performance" (O´Connor & Paunonen, 2007, p. 979). The first involves being ambitious, diligent and persistent; the second, involves being motivated to finish tasks and focused; and the third, comprises a concern on fulfilling moral obligations.

This construct is an important predictor of academic achievement as a substantial body of research points out (O' Connor & Paunonen, 2007). Conscientious students are deemed to be more organized, careful, self-disciplined and achievement oriented (McCrae & Costa, 1987).

The relation between conscientiousness and academic performance has often been interpreted in terms of motivation: conscientious students are thought to be more motivated to perform well academically than less conscientiousness students (Chamorro-Premuzik & Furnham, 2005). So it is likely that they have a sense of direction and work hard to achieve their goals. Thus we proposed that:

H1: A higher degree of conscientiousness leads to a higher intrinsic motivation.

H2: A higher degree of conscientiousness leads to a higher perceived learning.

H3: A higher degree of conscientiousness leads to a higher academic achievement.

2.2. Intrinsic motivation

Motivation is "a hypothetical construct used to describe the internal forces and/or external that lead to the initiation, direction, intensity and persistence of behavior" (Vallerand & Blanchard, 1998, p. 15). We can say that motivation is the force that drives us to carry out activities. We are motivated when we are able to sustain the efforts needed to accomplish the goals we set to ourselves and that we feel appealed to pursue (Ferreira et al., 2011).

Self-determination theory considers humans to be actively seeking optimal challenges and new experiences to master and integrate (Deci & Ryan, 1985; Deci & Ryan, 1991). Educational research has long recognized two basic types of motivational orientations, intrinsic and extrinsic, which have potentially different consequences on learning (Standage et al., 2005).

Intrinsic motivation refers to the engagement in activities for their own sake, namely for the feeling of pleasure, interest, and satisfaction that derive directly from participation (Deci & Ryan, 1985). When intrinsically motivated, individuals are fully self-regulated, engage in activities out of interest, experience a sense of volition, and function without the aid of external rewards and/or constraints (Deci & Ryan, 1985).

On the other hand, extrinsic motivation refers to a variety of behaviors that are undertaken for reasons other than the activity itself, such as external rewards, benefits, punishments, or obligations (Deci & Ryan, 1985).

The empirical studies stress the importance of intrinsic motivation in learning quality. Intrinsically motivated students are thought to seek out challenges, to extend and exercise their capabilities, and to explore and learn, compared with extrinsically motivated students who seek rewards such as grades, ego enhancement and social recognition (Ryan & Deci, 2000).

Students' motivated behaviors regarding choice of tasks as well as their effort and persistence in academic tasks have been directly related to their level of intrinsic motivation (Ferrer-Caja & Weiss, 2000, 2002). Besides, there is a strong relationship between intrinsic motivation and the use of self-regulated strategies related to learning performance. Classroom environments that enhance perceived autonomy by providing students choices and opportunities for self-direction have been associated with increased intrinsic motivation, while extrinsic rewards were found to undermine intrinsic motivation (Young, 2005).

When students are intrinsically motivated they are likely to be more hard-working and committed in learning activities which is essential for raising learning outcomes. So we formulated the following hypotheses:

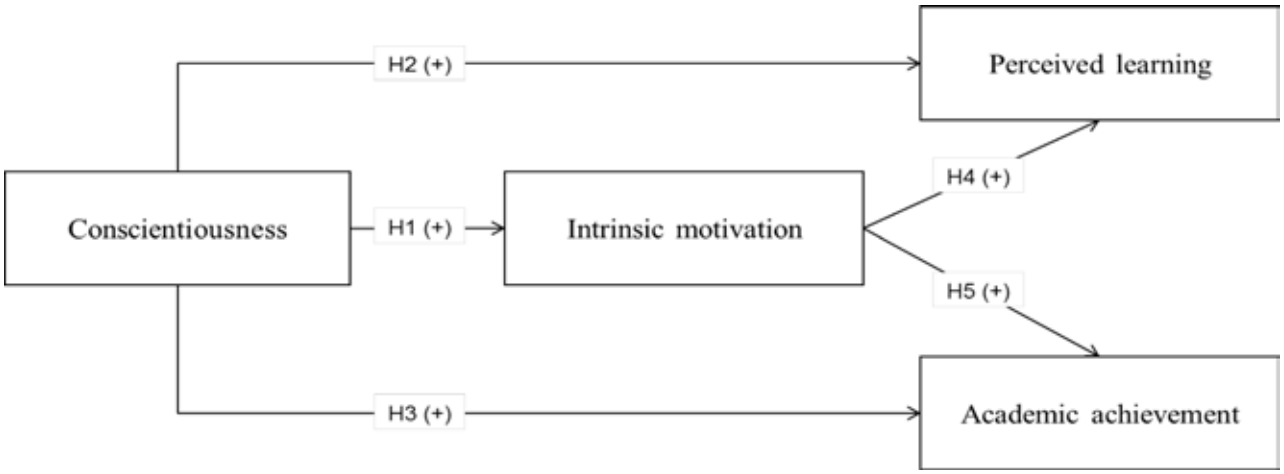
H4: A higher level of intrinsic motivation leads to a higher level of perceived learning.

H5: A higher level of intrinsic motivation leads to a higher level of academic achievement.

3. MODEL DEVELOPMENT

Based on previous research, our conceptual model presents the major determinants of learning outcomes (perceived learning and academic achievement) (Figure 1.). To sum up the model briefly, the conscientiousness directly and positively influences intrinsic motivation, perceived learning and academic achievement. In turn, intrinsic motivation directly and positively influences perceived learning and academic achievement (Figure 1).

Figure 1: Conceptual framework



4. METHOD

4.1. Sample and data collection

Data was gathered from a representative sample of 1986 high school students from eighteen schools from the center region of Portugal. Of the total number of respondents, 38.5% were male, and 61.5% were female, aged between 14 and 22 years (the average age of males was 16.69 years, SD=1.13, and that of females was 16.62 years, SD=1.14), and attending different levels of secondary education (10.º, 11.º and 12.º school year); 21.2% of the students had failed at least once, 36% studied less than an hour per day, whereas 45% studied one to two hours, and 8% studied between three to five hours.

Regarding the *type of study support*, that is not provided by the teachers , we found that, at school, 33.8% of respondents never received any support, 30.1% are supported occasionally and 4.2% say they are always supported; as for support outside of school, 36.8% said they were never supported, 26.9% receive occasional support and 4,6% admit they are always supported. Answering the same question, but regarding the family support, 34.5% of students are never supported, 29.2% are supported from time to time, and 4.0% are always supported, whereas outside of the family, the responses indicate that 46,5% of students never received support, 23.8% respond they are supported from time to time and only 2,0% said that are always supported.

4.2. Survey instrument

The study included measures used in previous research. A pretest was taken by a small sample of high school students to verify the factors reliability through Cronbach's alpha. The pretest results helped to refine the questionnaire.

The constructs addressed are measured through existing scales, which have been shown to exhibit sound psychometric properties. The items were designed to be answered using a 5-point Likert-type scale, with 1 indicating strongly agree and 5 strongly disagree.

Conscientiousness is composed by two items ("I try to perform all the tasks assigned to me conscientiously", and "I have a clear set of goals and work toward them in an orderly fashion") from one of the subscales of the NEO-Five Factor Inventory (NEO-FFI) (Costa & McCrae, 1992a).

Intrinsic motivation was operationalized using four item adapted from Young (2005) ("Having satisfaction of improving my personal knowledge and skills"; "Having a sense of personal accomplishment"; "Completing exciting and challenging class activities"; "Enjoying learning about an interesting subject").

Perceived learning is one of the factors that results from the five-factor "*Student Evaluation Model*" developed by Marks (2000), and is measured by two items ("I am learning a lot in this course"; "As a result of taking this course, I have more positive feelings toward this field of study").

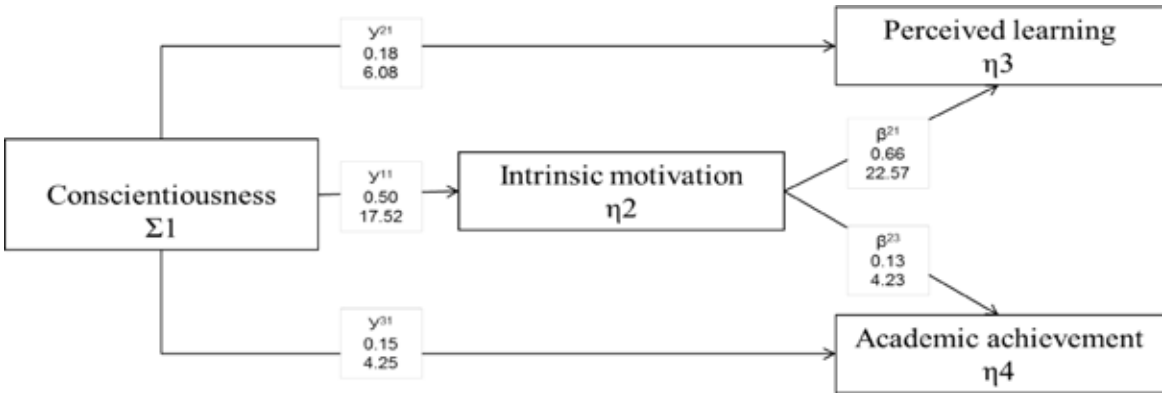
Academic achievement is the score resulting from the classification of the 1st and 2nd period of the last discipline attended, and the average level from all disciplines frequented (for a list of constructs, items, reliabilities and their sources, see Appendix A).

5. RESULTS AND DISCUSSION

A confirmatory factor analysis assessed the validity of the measures, using full-information maximum likelihood estimation procedures in LISREL 8.54 software (Jöreskog & Sörbom, 1996). Although the chi-square for this model is significant ($\chi2=204.30$, df=38, $p<0.00$), the fit indexes reveal a good model. The other generic adequacy measures are NFI=0.99, PNFI=0.68, CFI=0.99, IFI=0.99 and RMSEA=0.047. The large and significant standardized loadings of each item on its intended construct provide evidence of convergent validity (average loading is 0.79). All possible pairs of constructs passed discriminant validity test (Fornell & Larcker, 1981) (see Appendix A).

The final structural model has a chi-square of 205.81 (df=39, $p<0.00$), and the fit indexes suggest a good fit on the model to the data (NFI=0.99, PNFI=0.70, CFI=0.99, IFI=0.99, and RMSEA=0.046). The estimation results for the structural paths are in Figure 2. The results confirm all 5 hypotheses.

Figure 2: Conceptual framework



The findings revealed that conscientiousness has a positive impact on intrinsic motivation, and also on learning outcomes (perceived learning and academic achievement). These results are in line with previous empirical research that emphasizes the importance of personality factors on academic achievement (Gilles & Bailleux, 2001; Noftle & Robins, 2007; Poropat, 2009).

Conscientiousness is the most important factor of the Big Five predictors. Students who scores high on this factor have a high aspiration levels and work hard to achieve their goals; they are very diligent and purposeful and have a sense of direction. Thus they are more likely to be intrinsically motivated and to perform better on academic tasks.

Similarly, intrinsic motivation positively affects perceived learning. Students with higher levels of intrinsic motivation are more likely to self-evaluate themselves as learning a lot in the course and they have more positive feelings toward the field of study after taking a course, two indicators that overall characterize perceived learning. Also it influences positively the grades obtained on the course, and so, students' academic achievement.

Thus, it is important to build an active learning environment, contrary to the traditional classroom (Cardoso et al., 2011) in order to increase high school students' motivation (Garcia & Pontrich, 1996; Stipek et al., 1998) and to enhance intellectual development (McKeachie, 1990).

6. CONCLUSION

Conscientiousness and intrinsic motivation showed to be relevant predictors of learning performance in high school students. Corroborating previous studies, these findings suggest that personal factors are important to improve students' learning outcomes, namely perceived learning and academic achievement.

The findings provide useful information for teachers and school managers. First, it is relevant to take into account students' personal dispositions for a better identification of students who may not perform well (less organized, little self-disciplined, careless…) and implement strategies to enhance particular students' performance.

Second, it is important to develop institutional and pedagogical strategies that might increase the students' academic motivation, and their engagement in learning activities that should be stimulating and challenging.

In particular, teachers should design learning environments where students actively participate in the knowledge construction, providing opportunities for choice and self-direction. Thus, students may extend and exercise their capabilities, develop their autonomy and competence, and so improve their academic achievement.

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Polytechnic Institute of Viseu, the Center for Studies in Education, Technologies and Health (CI&DETS) and the Portuguese Foundation for Science and Technology (FCT).

Appendix A. Constructs, scale items and reliabilities

Constructs, scale items and reliabilities		Std. coefficients	T-values
CONSCIENTIOUSNESS			
(Scale 1 = Strongly disagree / 5 = Strongly agree)			
(a=.661, $\rho_{vc(n)}$=.50, ρ= .66)			
V1	I try to perform all the tasks assigned to me conscientiously	0.69	24.80
V2	I have a clear set of goals and work toward them in an orderly fashion	0.72	25.62
Adapted from Costa e McCrae (1992a)			
INTRINSIC MOTIVATION			
(Scale 1 = Strongly disagree / 5 = Strongly agree)			
(a=.855, $\rho_{vc(n)}$=.60, ρ= .86)			
V3	Having satisfaction of improving my personal knowledge and skills	0.83	43.16
V4	Having a sense of personal accomplishment	0.85	44.99
V5	Completing exciting and challenging class activities	0.72	35.57
V6	Enjoying learning about interesting subjects	0.69	33.57
Adapted from Young (2005)			
PERCEIVED LEARNING			
(Scale 1 = Strongly disagree / 5 = Strongly agree)			
(a=.77, $\rho_{vc(n)}$=.63, ρ= .78)			
V7	I am learning a lot in this course	0.84	39.60
V8	As a result of taking this course, I have more positive feelings toward this field of study	0.75	34.83
Adapted from Marks (2000)			
ACADEMIC ACHIEVEMENT			
(Ratio scale)			
(a=.90, $\rho_{vc(n)}$=.78, ρ= .91)			
V9	Classification obtained in the 1st period in the discipline	0.95	54.60
V10	Classification obtained in the 2nd period in the discipline	0.96	55.67
V11	Average classification on the set of all disciplines	0.73	37.60
Adapted from Young et al. (2003)			
Notes: a = Internal reliability (Cronbach, 1951) $\rho_{vc(n)}$ = MVE (Fornell & Larker, 1981) ρ = Composit reliability (Bagozzi, 1980)			

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THE EFFECTS OF CONSUMER PERCEPTION ON STORE IMAGE AND PRIVATE LABEL: COMPARATIVE STUDY BETWEEN TAIWAN AND JAPAN

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ABSTRACT

In this paper, we report on empirical results on the relation between a private label and store image in Taiwan and Japan. Private labels are generally defined as goods which shall be sold in a specific retailer as the retailer's original brand. Retailers preferred to sell private labels because the private label cannot be sold in other retail stores, and can contribute to the retailer's profit.

Private labels, however, have been regarded as cheaper goods than national brands. Indeed, average prices of private labels are always cheaper than national brands' are. So typically, when consumers choose a private label, just for price reason.

Recently in Japan, consumer perceptions to private labels are gradually changing. This change is attributed in some extent to new product development by convenience stores. These private labels are placed at better locations than national brands are in the stores. These private labels are no longer regarded as cheaper goods, rather as "the only-one goods" at the specific retail store.

In this paper, we examine how the consumers' perceptual characteristics and a store's image influence private label attitude and purchase intention. We conducted two surveys of 350 and 670 consumers both in Taiwan and Japan, respectively. We found that consumer perceptual characteristics and store image both impact on purchase intention, but that consumer perceptual characteristics have a stronger effect on private label attitude than store image. In addition, store image plays the role of antecedent in consumer perceptual characteristics.

KEY WORDS: private labels, consumer perception, store image, attitude, purchase intention.

1. INTRODUCTION

The purpose of this paper is to show two empirical results on the relation between private label and store image in Taiwan and Japan. Private labels, also known as store brands or private labels, are owned and branded by retailers. In our research, we will focus on the relation between consumer perceptions on private labels and store image.

Private label users have particular consumer perceptual characteristics, especially a price-quality related perception. Particular consumers will be attracted to the benefits of lower prices, and as a result lower prices become an important reason for purchasing private labels, in general (Hoch and Banerji, 1993). Ailawadi et al. (2001) indicate that price consciousness and low quality consciousness are particular characteristics of private label users.

International context of private labels, private labels have around 17% of the market share, and the rate of growth keeps increasing (ACNielsen, 2005). As private labels are priced on average 31% lower than national brands (ACNielsen, 2005). Private labels have become an important contribution for retailers to build consumer store loyalty (Richardson et al., 1996; Batra, 2000).

Nonetheless there are several persuasive empirical studies, the role of private labels is gradually changing in the Japanese retail context. Many Japanese convenience stores are developing and introducing a variety of private label goods. Private labels in Japan began in 1960 with Daiei, one of the biggest retailers in Japan (Ono, 2010).

Since 1960, Daiei led Japanese private label competitors against the national brands. Here national brand means products that large manufactures produced. Table 1 shows some samples of price differences between private labels and national brands in Japan. At that time, the reason Japanese consumers bought private labels was price. That is, private labels were cheaper than national brands. It took more than 20 years for our perceptions of private labels to slightly change. Brands are still cheaper, but one important difference exists; producers' names on them.

Table 1. Price differences between private label and national brand

	Detergent	Orange juice	Coke	Films (3 in one, ISO100)	Beer
NB	830	340	110	1470	220
PL	348	198	39	498	128

(Unit: JPY, EUR1=JPY120, average 1995)

Source: Ono (2010), p. 96, Figure 5-2.

It was normal that the original manufacturer was not known in private label developments. There have never been manufacturers' names on private label goods. Against this general trend, one dominant convenience store, 7-ELEVEn Japan now displays the manufacture's name on its private label goods. This is sometimes called "double-chop". In double-chop type private labels, consumers strongly care about which manufacture produced the private label goods. In this case, Japanese consumers do not choose a private label as cheaper goods. So, private labels do not have the same perception in an international context.

With regard to consumer perceptual characteristics, the link between store image and consumers purchase behaviour toward private labels is also being discussed. A store image is viewed as the image of a particular store in the consumer's minds (Chowdhury et al., 1998). Store image is an important factor in the retailer's ability to achieve a competitive advantage and is viewed as a predictor of consumer behaviour (Hartman and Spiro, 2005). Prior studies have indicated that store image directly impacts on consumer attitude and purchase intention toward private labels (Thang and Tan, 2003; Bao et al., 2011). Moreover, store image may also indirectly impact on the attitude and purchase intention of private labels. If a private label is perceived to be of lower quality, it might be due to the fact that store image is an extrinsic cue for improving the quality perception by a consumer toward a private label (Bao et al., 2011).

From above discussions, we suppose that store image and consumer purchase behaviour toward private labels are associated positively with each other. Hoch and Banerji (1993) indicated that the consumer factor and the retailer factor affected the development of private labels simultaneously. However, empirical research investigating the links between these two concepts is still scarce. Moreover, studies on private labels have been conducted primarily in Europe and the USA, and few studies are available in Asia (Jin and Suh, 2005; Au-Yeung and Lu, 2009).

In an attempt to bridge this gap, we investigated how consumer perceptual characteristics and store image influence the attitude and purchase intention toward private labels in both Taiwan and Japan. Our focus is primarily on price and quality related consumer perceptions toward private labels. Jin and Suh (2005) found that consumer innovativeness has a stronger influence than the perceptions of price and quality. Thus, in this study, the consumer perceptual variables consist of price consciousness, perceived quality variation, and consumer innovativeness. Store image variables include merchandize, store atmosphere, reputation, and service quality. In addition, we also investigated if store image is an antecedent of a consumer's individual perception. Our findings provide new insights to retailers allowing them to better apply the strategy of private labels to enhance their consumers' attitude and purchase intention toward the store's private label. The remainder of this paper is organized as follows. The next section develops the theoretical foundation for our hypotheses. We then describe the study method and the results, which are followed by a discussion of our findings.

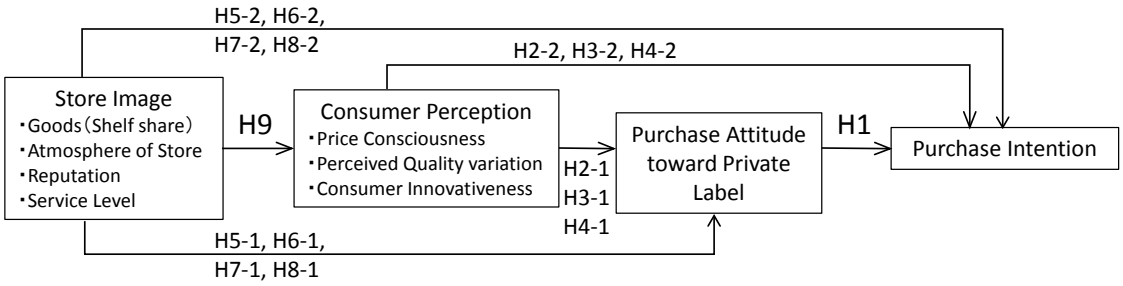
2. THEORY AND HYPOTHESES

2.1. Theory and Model

In this section, we develop research hypotheses. Before to do so, we will show our research framework. Figure 1 is the research framework. This framework describes the relationships among four main elements in our study. They are store image, consumer perception, purchase attitude toward private label, and purchase intention. The basis of this framework is based on the relationship between attitude and intention model (Fishbein and Ajzen, 1975).

This model supposes that purchase intention shall be constructed with consumers' attitudes. Attitude is defined as an expression of favour (or disfavour) toward a person, place, thing, or event; the attitude objects. In our study, purchase attitude forms purchase intention. This is related with a hypothesis 1. In regard with hypotheses, we will introduce later. Purchase attitude is influenced by two elements. One is consumer perception, another is store image. Moreover, these elements influence the others. So, we will specify our research hypotheses more detailed in next section.

Figure 1. Conceptual framework



2.2. Hypotheses

In our model, there are four elements. They are purchase intention, purchase attitude toward private label, consumer perception, and store image. They are all related. Then, we will define them and specify the relation as the research hypotheses below. All measures were adopted from prior research and were assessed using a Likert-type five-point scale.

Private label attitude and purchase intention

Private label attitude is an important factor in the prediction of purchase intention (Burton et al., 1998; Garretson et al., 2002). Existing literature has indicated that attitude and intention have a consistent relationship (Schiffman and Kanuk, 2000). When consumers consider private labels as being inferior, their purchase intention will be reduced (Jin and Suh, 2005). Private label attitude was measured by two items. The measures were derived from Burton et al. (1998). Purchase intention was measured by three items. The measures were adopted from Dodds et al. (1991). We therefore proposed the following hypothesis.

H1: Private label attitude is positively associated with purchase intention.

Consumer perceptual characteristics

Consumer perceptual characteristics have three factors; price consciousness, perceived quality variation, and consumer innovativeness. Those definitions and hypotheses are as follows.

Price Consciousness

Private label users pay more attention to price than national brand users do (Rothe and Lament, 1973). When consumers cannot understand the quality of a private label from the packaging or labeling, consumer can only use the price to evaluate the private label. Consumers use price as an indicator to whether to purchase a private label (Rothe and Lamont, 1973). Kirk (1992) found that 67% of the consumers who buy private labels consider price as a key factor. In addition, Batra and Sinha (2000) found that price awareness has a direct impact on purchase intention toward a private label. Because the lower price of a private label is the main reason of purchasing private label, it can be hypothesized that consumers that are more price conscious will prefer private labels. Price consciousness was measured by a two-item scale based on the scale from Lichtenstein et al. (1993) and Burton et al. (1988). The scale was used to measure the answer to the statements: “When I want to buy a product, I will look for the cheapest brand,” and “When I’m choosing a brand, the price is the most important factor”. We therefore proposed the following hypotheses.

H2-1: Price consciousness is positively associated with private label attitude.

H2-2: Price consciousness is positively associated with purchase intention.

Perceived Quality Variation

This means the fact that consumers perceive that there is a difference in quality between national brands and private labels (Richardson et al., 1996). In general, the level of perceived quality of national brands is higher than that of private labels (Cunningham et al., 1982; Richardson et al., 1994). Prior studies have shown that perceived quality variation affects the consumer’s attitude and purchase intention toward a private label (Richardson et al., 1996; Batra and Sinha, 2000). If consumers are more inclined to buy private labels, then that means that consumers consider that the variation in quality between a private label and a national brand is low. Perceived quality variation was measured by two items adopted from Dick et al. (1995). The scale assessed the difference between national brands and private labels for overall quality and reliability of ingredients. We therefore propose the following hypotheses.

H3-1: Perceived quality variation is negatively associated with private label attitude.

H3-2: Perceived quality variation is negatively associated with intention to purchase.

Consumer Innovativeness

Here, we employ the definition of consumer innovativeness, as Ailawadi et al. (2001)’s; it is a psychological consumer characteristic of exploring new things. Innovative consumers can judge independently and are more willing to buy a new product (Manning et al., 1995). When a private label is considered as a new product, consumers with innovative tendencies will have a positive perception toward private labels (Granzin, 1981). Jin and Suh (2005) found that consumer innovation positively affects private label attitude and purchase intention. Consumer innovativeness was measured by five items. The measures were adopted from Manning et al. (1995). We therefore proposed the following hypotheses.

H4-1: Consumer innovativeness is positively associated with private label attitude.

H4-2: Consumer innovativeness is positively associated with purchase intention.

Store Image

Store image is a combination of overall perception of consumers of a store (Lindquis, 1974), and is particularly derived from their subjective and objective perceptions (Hartman and Spiro, 2005). The conceptualization of store image attributes is diverse and multi-dimensional (Vahie and Paswan, 2006). According to the literature (Sirohi et al., 1998; Thang and Tan, 2003), store image in this study will refer to merchandise, atmosphere, store reputation, and service quality.

Consumers use this image to evaluate a store. Bao et al. (2011) indicate that a store image may reduce consumers' uncertainty about the quality of a store's private label and that it influences their willingness to buy. Prior research has found that a store's image has a positive relationship with private label attitude and purchase intention (Grewal et al. 1998; Collins-Dodd and Lindley, 2003; Vahie and Paswan, 2006; Bao et al., 2011). Consequently, consumers will adopt a positive attitude and intention to purchase toward a private label if they have a good image of the store. The dimensions of store image included merchandize, atmosphere, reputation, and service quality (Thang and Tan, 2003; Sirohi et al., 1998). Service quality was measured by five items, merchandize and reputation were both measured by two items, and atmosphere was measured by three items. We therefore proposed the following hypotheses.

H5-1: Merchandise is positively associated with private label attitude.

H5-2: Merchandise is positively associated with purchase intention.

H6-1: Atmosphere is positively associated with private label attitude.

H6-2: Atmosphere is positively associated with purchase intention.

H7-1: Reputation is positively associated with private label attitude.

H7-2: Reputation is positively associated with purchase intention.

H8-1: Service quality is positively associated with private label attitude.

H8-2: Service quality is positively associated with purchase intention.

Antecedent of store image on the individual perception of consumers

The consumers' attitude toward a private label may become negative if they have an uncertain attitude towards the quality of that private label and consider it a risky product (Richardson et al., 1996; Batra and Sinha, 2000). Store image is an extrinsic cue that provides a reference for the consumer to evaluate a private label (Bao et al., 2011). Prior studies found that store image may affect consumer perception, especially quality perception (Richardson et al., 1996; Bao et al., 2011). We therefore proposed the following hypothesis.

H9-1: Store image is positively associated with price consciousness.

H9-2: Store image is positively associated with a variation of perceived quality.

H9-3: Store image is positively associated with consumer innovativeness.

3. DATA COLLECTION AND ANALYSIS

3.1 Data Collection

In previous section, we have defined and set our research hypotheses on store image, consumer attitude for private label, and purchase intention. Our research model is not complicated, but also tricky. Here we explain the research method related issues. We observed the effects of consumer perception and store image on private label attitude and purchase intention in a convenience store chain. According to the AC Nielsen report, compared to other retail industries, private labels in convenience stores have a high rate of growth (ACNielsen, 2008a). The main convenience store chain both in Taiwan and Japan, 7-ELEVEn was chosen as the convenience store chain for our questionnaire survey.

In order to ensure what was meant by private labels, a detailed written description of the 7-ELEVEn private label products was provided, complete with photos, at the beginning of the questionnaire. Respondents were requested to answer the question according to their experience with 7-ELEVEn and their private label products. We had two surveys in Taiwan and Japan. In Taiwan, from the 692 questionnaires that were handed out, a total of 350 usable responses were received, yielding a 50.6% response rate. Of these eligible participants, 52.0% were male, and 48 % were female, with 71.2% of them ranging in age between 18 to 34. In Japan, 593 were used out of 720 questionnaires; for male 403, 56.0% and for female 317, 44.0%. These demographics are similar to those in the survey of AC Nielsen (2008b) in which the majority of the users of the convenience store were male, ranging in age from 15 to 34.

3.2 Analysis

In this section, we will analyse data above. In this analysis, as Figure 1 above showed, a structural equitation modelling shall be employed. This model is included two main variables. One is causal relations of measured variables. Another is to show latent variables. The former employed regression analysis and the latter used a confirmatory factor analysis. Here we show two results; Taiwan's and Japan's because Japan's analysis was not convergence the model estimation. Here, first we show Taiwan result, then Japan result.

3.2.1 Taiwan Results

Taiwan result shall be shown below as construct validity and overall model fitting indicators. Detailed results in descriptive statistics are reported in table 2. This table 2 provides the means, standard deviations and correlation of the variables used in this study.

Table 2. Descriptive statistics in both Taiwan and Japan results

	1T	1J	2T	2J	3T	3J	4T	4J	5T	5J	6T	6J	7T	7J	8T	8J	9T	9J	Mean(T)	Mean(J)	S.D.(T)	S.D.(J)
1 Price consciousness	1.000	1.000																	2.813	2.329	0.794	0.384
2 Perceived quality variation	0.151	0.004	1.000	1.000															5.391	3.052	1.512	0.496
3 Consumer innovativeness	0.144	0.046	-0.135	-1.310	1.000	1.000													3.442	3.679	0.676	0.472
4 Marchandise	0.030	0.149	-0.038	-2.040	0.080	0.135	1.000	1.000											3.426	2.816	0.749	0.789
5 Atmosphere	0.017	0.178	-0.025	0.880	0.200	0.175	0.374	0.125	1.000	1.000									3.656	3.486	0.567	0.419
6 Reputation	0.092	0.161	-0.105	-0.017	0.109	0.136	0.357	0.091	0.401	0.612	1.000	1.000							7.350	3.361	1.310	0.480
7 Service quality	-0.096	0.168	-0.120	0.003	0.234	0.190	0.292	0.111	0.451	0.599	0.422	0.419	1.000	1.000					3.600	3.684	0.547	0.454
8 Private label attitude	-0.121	0.114	-0.221	0.059	0.174	0.189	0.102	0.108	0.039	0.582	0.273	0.393	0.105	0.628	1.000	1.000			2.970	3.719	0.617	0.444
9 Purchase intention	-0.080	0.651	0.049	0.009	0.140	-0.034	0.090	0.148	0.065	0.133	0.162	0.108	0.157	0.108	0.520	0.093	1.000	1.000	3.328	2.668	0.672	0.860

Note: Bold boarder p<0.05, shade p<0.01

Construct Validity

A confirmatory factor analysis was used to assess the measurement model. The measurement model fitted the data acceptably (chi-square=387.780, df=288, p=0.000; GFI=0.925, CFI=0.972, NFI=0.901, RMSEA=0.032), and all factor loadings were significant (p<0.001). The composite reliability of all the constructs exceeded the 0.60 threshold. The average variance extracted scores from this analysis ranged between 0.499 and 0.670. Overall, these results showed that our proposed measures possessed adequate reliability and validity.

Overall Model

The results are shown in Table 3. H1 postulated that private label attitude impacts purchase intention. Private label attitude was positively associated with purchase intention (β=0.546, p<0. 001), thus supporting H1. H 2-1 to H4-1 postulated that perceptual characteristics of the consumer impact private label attitude. As shown in Table 3, price consciousness and consumer innovativeness were positively related to private label attitude (β=0.168, p<0. 05; β=0.238, p<0.001), thus supporting H2-1 and H4-1. Perceived quality variation was negatively related to private label attitude (β=-0.190, p<0. 05), thus supporting H3-1.

H2-2 to H4-2 postulated that the perceptual characteristics of the consumer impact purchase intention. As shown in Table 3, price consciousness was positively related to purchase intention (β=0.180, p<0. 01), thus supporting H2-2. However, perceived quality variation and consumer innovativeness were not significantly associated with purchase intention (β=0.107; β=-0.003), thus failing to support H3-2 and H4-2.

H 5-1 to H8-1 postulated that the attributes of store image impact private label attitude. Service quality was positively associated with private label attitude (β=0.284, p<0. 01), thus supporting H8-1. However, the rest of the hypotheses were not significantly associated with private label attitude (H5-1: β=0.032; H6-1: β=-0.055; H7-1: β=-0.047), thus failing to support H5-1, H6-1 and H7-1.

H5-2 to H8-2 postulated that the attributes of store image impact purchase intention. Reputation was positively associated with purchase intention (β=0.181, p<0. 05), thus supporting H7-2. However, the rest of the hypotheses were not significantly associated with private label attitude (H5-2: β=0.044; H6-2: β=-0.160; H8-2: β=-0.031), thus failing to support H5-2, H6-2 and H8-2.

Table 3. Hypotheses Tests (H1-H8)

		β	t	Results
H1	Private label attitude -> Purchase intention	0.546***	6.09	Accepted
H2-1	Price consciousness -> Private label attitude	0.168*	2.30	Accepted
H2-2	Price consciousness -> Purchase intention	0.18**	2.69	Accepted
H3-1	Perceived quality variation -> Private label attitude	-1.90*	-2.29	Accepted
H3-2	Perceived quality variation -> Purchase intention	0.11	1.58	
H4-1	Consumer innovativenss -> Private label attitude	0.238***	3.65	Accepted
H4-2	Consumer innovativenss -> Purchase intention	0.00	-0.05	
H5-1	Marchandize -> Private label attitude	0.03	0.38	
H5-2	Marchandize -> Purchase intention	0.04	0.58	
H6-1	Atompshere -> Private label attitude	-0.06	-0.56	
H6-2	Atompshere -> Purchase intention	-0.16	-1.72	
H7-1	Reputation -> Private label attitude	-0.05	-0.52	
H7-2	Reputation -> Purchase intention	0.181*	2.08	Accepted
H8-1	Service quality -> Private label attitude	0.284**	3.06	Accepted
H8-2	Service quality -> Purchase intention	-0.03	-0.36	
*p< 0.05, **p< 0.01, ***p< 0.001				
		Model fit		
		Chi-squre	386.555	
		df	291	
		GFI	0.926	
		CFI	0.979	
		NFI	0.902	
		RMSEA	0.031	

Model of antecedent of store image on consumer individual perception

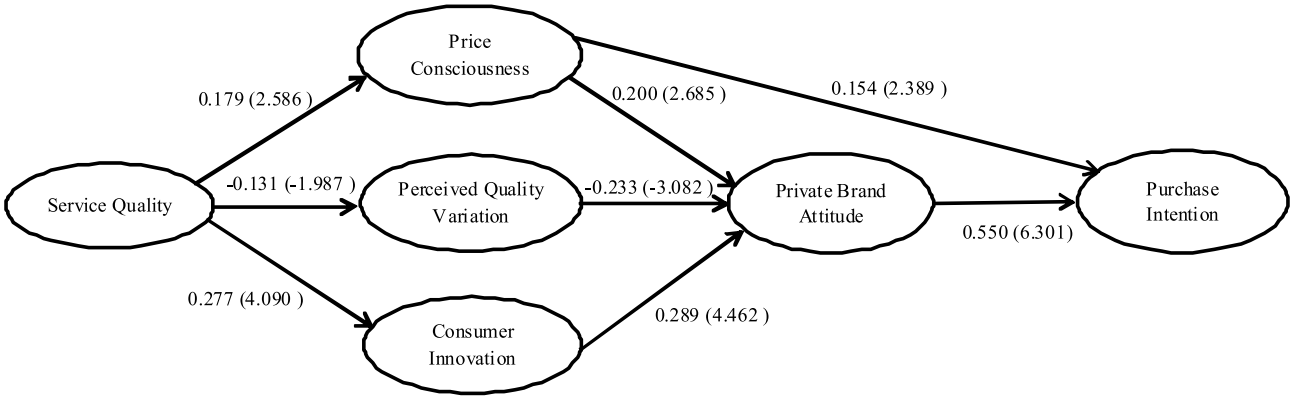
As mentioned above, the model proposed that store image is considered the antecedent of the perceptual

characteristics of the consumer and these characteristics are viewed as the antecedent of private label attitude and purchase intention. The results obtained from the confirmatory factor analysis using Amos 7 are shown in Table 4. The results indicated a good fit of the model to the data (chi-square=454.136, df=305, p=0.001; GFI=0.912, CFI=0.958, NFI=0.884, RMSEA=0.037). All the factor loadings were significant at the 0.001 level. As shown in Table 4, the effect of the perceptual characteristics of the consumer on private label attitude and purchase intention in this model were the same as those of the overall model (Table 3 and Figure1). H9-1 to H9-3 postulated that store image impacts the perceptual characteristics of the consumer. Store image was positively associated with price consciousness (β=0.179, p<0. 01), perceived quality variation (β=-0.131, p<0. 01) and consumer innovativeness (β=0.277, p<0. 01), thus supporting H9-1, H9-2 and H9-3.

Table 4. Hypothesis Test (H9)

		β	t	Results
H9-1	Store image -> Price consciousness	0.179**	2.59	Accepted
H9-2	Store image -> Perceived quality variation	-0.131*	-1.99	Accepted
H9-3	Store image -> Consumer innovativenss	0.277***	4.09	Accepted
H3-1	Price consciousness -> Private label attitude	0.200**	2.69	Accepted
H3-2	Price consciousness -> Puchase intention	0.154*	2.39	Accepted
H4-1	Perceived quality variation -> Pivate label attitude	-0.233**	-3.08	Accepted
H4-2	Perceived quality variation -> Purchase intention	0.10	1.55	
H5-1	Consumer innovativenss -> Private label attidude	0.289***	4.46	Accepted
H5-2	Consumer innovativenss -> Purchase intention	-0.02	-0.35	
H6-1	Private label attitude -> Purchase intention	0.550***	6.30	Accepted
*p< 0.05, **p< 0.01, ***p< 0.001				
		Model fit		
		Chi-squre	454.136***	
		df	305	
		GFI	0.912	
		CFI	0.958	
		NFI	0.884	
		RMSEA	0.037	

Figure 3. Results of the Antecedent of Store Image on the Perceptual Characteristics of the Consumer



Note: Only significant paths were included. The number in parentheses denotes t-value.

3.2.2. Japan Results

The result of Japan did not convergent as the same model with Taiwan's, but it has some characteristic. As Table 2 showed, most mean of variables in Taiwan had bigger than Japan had; price consciousness, perceived quality variation, merchandise, atmosphere, reputation, and purchase intention. Compared to means, standard deviations did not show the same pattern to mean. For instance, merchandise and purchase intention were smaller deviation than Japan had. This result means that Japanese consumers have many varieties of thoughts to private label of convenience stores.

Hypothesis Tests

As we noticed above, Japanese result Rotation failed to converge in specific iterations (default times were 25.). Here we will show regression results. Our structural equitation modelling above was actually multi variate regression, but the modelling could estimate the fitness of overall model.

Table 5. Hypothesis Tests (H1- H8)

		β	t	Results
H1	Private label attitude -> Purchase intention	0.61	20.70	Accepted***
H2-1	Price consciousness -> Private label attitude	0.13	2.76	Accepted**
H2-2	Price consciousness -> Purchase intention	0.13	2.67	Accepted*
H3-1	Perceived quality variatio in -> Private label attitude	-0.06	-1.34	
H3-2	Perceived quality variatio in -> Purchase intention	-0.10	-2.14	Accepted*
H4-1	Consumer innovativenss -> Private label attitude	0.09	2.17	Accepted*
H4-2	Consumer innovativenss -> Purchase intention	0.01	0.12	
H5-1	Marchandize -> Private label attitude	0.08	1.37	
H5-2	Marchandize -> Purchase intention	0.08	1.45	
H6-1	Atompshere -> Private label attitude	0.05	1.13	
H6-2	Atompshere -> Purchase intention	0.09	1.76	Accepted*
H7-1	Reputation -> Private label attitude	0.14	2.56	
H7-2	Reputation -> Purchase intention	0.00	-0.03	
H8-1	Service quality -> Private label attitude	-0.05	-0.89	
H8-2	Service quality -> Purchase intention	-0.03	-0.46	
*p< 0.05, **p< 0.01, ***p< 0.001				
		H1	Hn-1	Hn-2
R^2		0.38	0.06	0.03
df		1	7	7
F		428.59	6.70	3.15

As Table 5 showed, results of regression were not satisfied from Japanese survey. Rather insufficient power of explanations was. Some of hypothesis was accepted, but overall powers of explanations were very weak, R2 s for both Hn-1 and Hn-2 were very low.

However, in detail, price consciousness significantly influenced both private label attitude and purchase intention. Perceived quality variation could influence purchase intention. The higher consumer innovativeness, the higher private label attitude. And atmosphere influenced purchase intention. Only five variables could be accepted from Japanese survey. And since Japanese survey was not accepted by structural equation modelling, it did not have the results of the antecedent of store image on the perceptual characteristics of the consumer, like in figure 3 in this time.

4. DISCUSSION

Investigating the combined impact of consumer-level factors and retailer-level factors on predicting purchase intention of private label products is necessary to some extent of understand consumer behaviour toward private labels. In addition, there is scant literature available on the topic of private labels in Asia. The main objective of this paper was to examine the impact of the perceptual characteristics of the consumer and their store image on their purchase decision toward private labels in a convenience store chain in Taiwan and Japan. By combining these two concepts, this study was able to determine their relative importance, and in addition determined that store image is the antecedent of the perceptual characteristics of the consumer.

All consumer perceived variables were found to have a significant effect on private label attitude. However, only one store image variable, service quality, was associated with private label attitude, and purchase intention rose significantly with price consciousness and reputation. Therefore, the perceptual characteristics of the consumer have a stronger impact on private label attitude than does store image, it has however the same effect on purchase intention as store image.

In particular, both in Taiwan and Japan, price consciousness impacts both private label attitude and purchase intention, as suggested in the literature (Batra and Sinha, 2000; Ailawadi et al., 2001). Consequently, lowering the prices of private labels may build greater consumer acceptance of private labels and improve purchase intention. Private label goods are still price conscious buying behaviour in Japan. Japanese consumer still regarded private label goods as cheaper.

Second, consistent with earlier research (Sethuraman and Cole, 1999), we found that perceived quality variation was negatively related to private label attitude in Taiwan, but not in Japan. Higher perceived quality variation leads to a lower acceptance of the private label. However, perceived quality variation was not associated with purchase intention. This means that perceived quality variation impacts purchase intention by means of the private label attitude.

Third, we found that consumer innovation has an effect on private label attitude both in Taiwan and Japan, as suggested in the literature (Jin and Suh, 2005). This result seems to indicate that a private label is viewed as a new product in the convenience stores, which tend to have only a short history of private labels. However, consumer innovation was not associated with purchase intention. This means that consumer innovation affects purchase intention by means of private label attitude.

Fourth, in terms of store image, service quality had a direct effect on private label attitude, and reputation was positively associated with purchase intention. Prior studies found that store image is viewed as an extrinsic cue that reduces purchase risk and improves the private label attitude and purchase intention (Richardson et al., 1996; Bao et al., 2011). These findings indicate that although service quality affects purchase intention by means of private label attitude, it is reputation that directly impacts purchase intention.

Finally, store image was found to be an antecedent of the perceptual characteristics of the consumer. This is consistent with the literature regarding the impact of a store's image on the perceptual variables of the consumer toward private labels (Bao

et al., 2011). The perceptual characteristics of the consumer regarding private label attitude and purchase intention are established based on a strong store image.

5. IMPLICATIONS AND FUTURE RESEARCH

In this paper, we conducted consumer perception of relationship between private label and store image. This empirical study is important to conventional understanding of private label. Private label has been regarded as cheaper goods than national brand goods were.

Private label, however, must play different role in different country. For instance, private label is no longer regarded as cheaper goods in Japan. Dominant convenience store, now, developed private label with convenience store brand and manufacture's name. This type of private label received good reputation in some generation.

Second, store image is considered an antecedent of the perceptual characteristics of the consumer toward private labels. These findings provide an insight why retailers should adjust their management to transfer their store image to their private label. For example, consumers seek hedonic shopping in department stores, but they seek utilitarian shopping in discount stores. Thus managers of department stores should focus on creating a high quality of store image to enhance the acceptance of their private labels by their customers.

A number of future research ideas arise from the findings of this study. First, this study did not focus on a particular product category. Prior research has found that different product categories have different effects on private label attitude and purchase intention (e.g. Jin and Suh, 2005). Thus, future research could discuss the different impact of different product categories. Second, because different types of retailers develop a different store image, more research is needed to investigate the different types of retailers.

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INTERNATIONAL DIVERSIFICATION AND PERFORMANCE IMPROVEMENT IN PORTUGUESE SMES: THE MEDIATING ROLE OF INTERNATIONAL LEARNING

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ABSTRACT

International operations, with its multiplicity of objectives, can be seen as a diversification strategy, sometimes even as a strategic option taken as an effective alternative to product diversification. This work, focusing on a sample of SMEs of Portuguese manufacturing industries, analyzes the mediating role of experiential knowledge arising from the international learning, on the relationship between the international diversification strategies and performance. Data used were collected in 390 companies through an online questionnaire. Data analysis suggests the existence of this mediating effect, stressing therefore its importance as a potential source of competitive advantage. These results provide guidelines for managers and generate directions for future research.

KEY WORDS: international diversification, intensity, scope, international learning, international performance, mediating role.

1. INTRODUCTION

Enhance performance through international intervention, developing various strategies to achieve this goal, has become a crucial, if not critical, task to many managers around the world, even for those running smaller enterprises (Hymer, 1968; Dunning, 1980; Lu and Beamish, 2001; Hitt *et al.*, 2006a; Cavusgil *et al.*, 2012). International diversification of a company can be defined as the phenomenon of expansion beyond borders of countries and global origin regions, aiming at different locations or markets (Hitt *et al.*, 1997). It is a concept that refers to the geographical scope of the international presence of the company (Goerzen and Beamish, 2003) and it reveals the extent of their dependence on external markets (Thomas and Eden, 2004). According to Contractor (2007), the use of "international diversification" instead of "degree of internationalization" should be avoided, unless it is a reference to an explicit purpose of global risk reduction of the multinational company. However, researchers in the area of strategic management have a richer perspective of international diversification than the simple risk reduction strategy (Hitt *et al.*, 1994), considering it a way to strengthening competitiveness, which is why the research area has dedicated so much attention to the study of the relationship between international diversification and performance (Hitt *et al.*, 2006a). This is the prevailing perspective in this study.

2. THEORETICAL BACKGROUND AND HYPOTHESES DEVELOPMENT

International performance

Despite the diversity of topics and subjects studied in the context of international diversification (Buckley and Casson, 2009; Buckley, 2011), undoubtedly one of the most targeted by this investigative stream has been the relationship between this type of strategy and performance achieved. However, despite numerous and important contributions to the understanding of the relationship between international diversification and performance (DI-P), this enormous diversity of work has proved inconclusive, inconsistent, if not contradictory (Chao and Kumar, 2010; Beleska-Spasova *et al.*, 2012). While some of these studies point out to the existence of a positive relationship between international diversification and performance (e.g., Grant *et al.*, 1988; Delios and Beamish, 1999a; Pangarkar, 2008), other works report the existence of different type of relations, for example, "U-shaped" (Lu and Beamish, 2001; Ruigrok and Wagner, 2003), inverted "U-shaped" (Hitt *et al.*, 1997; Kotabe *et al.*, 2002), "Horizontal S" (Contractor *et al.*, 2003; Lu and Beamish, 2004), pointing, still others, for a linear and negative relationship (Fatemi, 1984; Collins, 1990). Not integrated into any of the above mentioned situations,

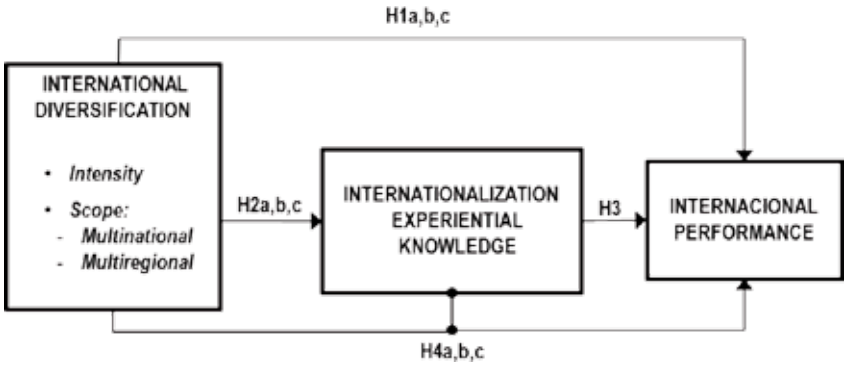
some studies (Siddharthan and Lall, 1982; Hoskisson and Hitt, 1990) didn't find any kind of relationship. However, from a business point of view, as revealed by the attitude of thousands of companies worldwide, the expectation is always that there are advantages in strengthening their internationalization processes. And, indeed, from an academic point of view, most of the studies show that these expectations are often confirmed (Contractor, 2007). This is obviously the basic assumption that supports all research work in international business (Contractor *et al.*, 2003). Several authors have advocated the dependence of ID-P (International Diversification-Performance) relationship to aspects such as the industry in question, company factors, foreign markets cultural, political and institutional aspects (Contractor, 2007) or even contextual factors from the home market (Nachum, 2004). Stressing the argument that the reality of origin or host markets have also an influence on the ID-P relationship, (Barkema *et al.*, 1996) researched and confirmed an influence of the cultural factors in destination countries, having Nachum (2004) recognized the existence of a significant effect of the company's origin region on that relationship.

International learning

Organizational learning through experience is enhanced by the degree of diversity of that experience (Penrose, 1959). Exposure to diversity of contexts, events and ideas has positive influence on the degree of knowledge, whether technological or administrative in nature or even in adopting a more innovative approach (March, 1991). Thus, a firm acting in several countries and therefore facing a greater diversity of environments is potentially more-prone to the development of knowledge when compared to other companies operating only in their local market or in very few countries (Barkema and Vermeulen, 1998). Organizational knowledge and learning are interconnected (Eriksson *et al.*, 1997; Petersen *et al.*, 2008). Organizational learning mechanism is developed as a process of transformation of accumulated experience into useful knowledge for the organization (Petersen *et al.*, 2008; Sandberg, 2014). Through the experience gained in the course of its international operations, the firm, subjected in this context to an intense learning process, will acquire experiential knowledge to its international business, not only at international generic level, but also in terms of specific local markets as well as in what international individual relationships is concerned (Sandberg, 2014). One of the most important experiential knowledge categories in the international business setting is the internationalization knowledge (Eriksson *et al.*, 2000a; Hilmersson, 2012) or, to use the designation suggested by Sandberg (2013; 2014), the internationalization experiential knowledge. This kind of experiential knowledge refers to the ability of a company to carry out research of various kinds in markets outside its home base, although having nothing to do with aspects or specific details of this or that market in particular (Blomstermo *et al.*, 2004a). Internationalization experiential knowledge stemming from international learning is object of study in this research work.

Figure 1 presents the conceptual model of this study.

Figure 1. Conceptual model



International diversification and international performance

Depending on the priority given to intensity and scope dimensions of company's international intervention, this may occur more by concentration or diversification of international markets (Ayal and Zif, 1979; Saarenketo *et al.*, 2008). Also in this context, Cieślik *et al.* (2012) refer to alternative strategies of balance or, to use author's words, ambidextrous international strategic options. Not being conclusive on which strategy has a more intense effect on performance, results from different studies in this field (e.g., Cooper and Kleinschmidt, 1985; Crick *et al.*, 2000; Katsikea *et al.*, 2005), instead, generally have revealed positive influence in both cases. Thus, we propose the following hypotheses:

Hypotheses 1a, 1b, 1c: International diversification, in terms of (1a) intensity, (1b) multinational scope and (1c) multiregional scope, has a positive effect on international performance.

International diversification and internationalization experiential knowledge

According to Yeoh (2004), the international diversification of a company can be envisaged as an organizational

learning process and, therefore, a means of knowledge accumulation through experience acquired with the internationalization process. This interpretation, in line with the same author, is based on the fact that this type of strategy, favoring exposure to a wider range of markets, enhances the chances of occurring organizational learning. The potential raise of opportunities for knowledge acquisition derives from this greater exposure that, influenced by cultural diversity, takes place through the "coexistence" with new and diverse ways of doing business in the various markets in which the company operates. One kind of experiential knowledge developed by the companies during their internationalization process is experiential knowledge of internationalization (Johanson and Vahlne, 1977; Eriksson *et al.*, 1997; Sandberg, 2013). Inasmuch as the reinforcement in any dimension of the international diversification strategy, both in intensity or scope, enhances exposure to diversity and favors international learning, the following hypotheses are formulated:

Hypotheses 2: International diversification, in terms of (2a) intensity, (2b) multinational scope and (2c) multiregional scope, has a positive effect on internationalization experiential knowledge.

Internationalization experiential knowledge and international performance

Experiential knowledge is identified in several studies as an antecedent of international performance (e.g., Katsikeas *et al.*, 2000; Yeoh, 2004). The level of experiential knowledge of internationally more experienced companies may leverage superior performance (Delios and Beamish, 1999a; Blomstermo *et al.*, 2004a). Or, even more specifically, international learning can be analyzed as a complex resource to use in strengthening or development of competitive advantage and, therefore, in getting high performance in international business (Yeoh, 2004). Based on this discussion, the following hypothesis is formulated:

Hypothesis 3: Internationalization experiential knowledge has a positive effect on international performance.

Efeito mediador do conhecimento experiencial de internacionalização na relação "diversificação internacional-desempenho internacional"

According to Buckley *et al.* (1988), company's international performance is the result of competitiveness level, past or present, achieved by the company through its choices and initiatives in the context of its international activities. The entry in international markets enables the company to acquire knowledge through which it develops new capabilities to carry out value creation activities (Ghoshal, 1987; Zahra *et al.*, 2000). On the other hand, Hsu and Pereira (2008) argue that companies engaged in learning through their international intervention continuously strive to create competitive advantage in international markets and, thus, improve their performance. International diversification strategies, either with priority to intensity or scope, normally require the need of dealing with diversity in terms of countries, markets and market segments, which can lead to significant organizational learning and knowledge accumulation. This learning process arising from the confront with all that diversity, allowing, for instance, the exploitation of scope or scale economies resulting from higher international presence (Ayal and Zif, 1979; Zahra *et al.*, 2000; Saarenketo *et al.*, 2008), may become an important basis for strengthening and sustaining competitive advantage and, therefore, to achieve superior performance. Consequently, we propose the following hypotheses:

Hypotheses 4a, 4b, 4c: The relationship between international diversification, in terms of (4a) intensity (4b) multinational scope and (4c) multiregional scope, and international performance is mediated by internationalization experiential knowledge.

3. METHODOLOGY

Sample

Sample selection was based exclusively on a database (of Portuguese exporter companies) from the AICEP - Agency for Investment and Foreign Trade of Portugal. As basic profile in terms of firm size, we adopted the SME definition according to the European Union and, thus, the minimum number of 10 employees and a maximum turnover EUR 250 million were defined as requirements. Besides, in line with Beleska-Spasova and Glaister (2010), we established, as additional conditions, the involvement in international business at the time, and that this involvement should be, in terms of minimum previous temporal period, of at least five years, nevertheless, without defining a minimum value for the foreign sales to total sales ratio. The five years minimum period of involvement in international business was considered sufficient to assess the impact of international diversification in performance (Beleska-Spasova and Glaister, 2010; Beleska-Spasova *et al.*, 2012). After adjusting the original database to the requirements, a list of 2895 companies was then compiled, and, thus, the sampling frame used in the study was established. As final result of the data collection process, we obtained 390 valid questionnaires, corresponding to an effective rate higher than 16%, which can be considered a satisfactory rate, since the average percentage level of response in case of questionnaires sent to top managers is typically between 15 and 20% (Menon *et al.*, 1996).

Measures

The following measures were adopted for this study's independent, dependent and control variables.

International diversification.

International diversification strategies were investigated along the two following dimensions: intensity and scope. In order to assess the first dimension, the intensity, we used the foreign sales to total sales ratio. This is an international

engagement indicator widely used in the literature (e.g., Lu and Beamish, 2001; Kafouros *et al.*, 2008; Hsu *et al.*, 2013). Regarding the scope of international diversification, it was measured in two different perspectives: (1) the level of presence in multinational terms, measured by the number of countries where the company operates and (2) the distribution of these operations for a set of predefined globe regions. The measure of international diversification strategy's scope in a multinationality perspective, originally used by Vernon (1979) and since then also widely used in the literature (e.g., Tallman and Li, 1996; Zahra *et al.*, 2000; Lu and Beamish, 2006; Yeoh, 2014), aims at evaluating the overall geographical distribution of activities, without, however, consider any other quality of this distribution. Due to this feature of the scope's measure through the number of countries, some authors have been criticizing its use, since it assumes the absence of differences between countries in terms of cultural, institutional and business practices (Yeoh, 2004). Therefore, for measuring the dimension "scope", we also used an entropy measure, developed by Hitt *et al.* (1997), which considers both the number of global market regions in which a firm operates and the relative importance of each one. According to those authors, international diversification can be calculated by the following expression:

$$ID = \sum_i^n [P_i \times ln(1/P_i)]$$

In this expression, P_i is the company's sales volume in the region *i* and $ln\ (1/P_i)$, ie, the natural logarithm of the inverse of this sales volume, represents the sales weight of region *i*. In this study, the following regions of the world were considered: European Union PALOP (African Countries of Portuguese Official Language), NAFTA (North American Free Trade Agreement), Maghreb, MERCOSUR (Southern Common Market) and Rest of World.

Internationalization experiential knowledge

Internationalization experiential knowledge was measured based on a scale used by Sandberg (2014) (for further details see Appendix).

International performance

For the assessment of international performance we used the EXPERF scale developed by Zou et al. (1998). Data collected through this scale reflected the perception of the informants on the company's international performance in the previous three years (see Appendix).

Control variables

Since other factors may have an effect on the relationships presented in the hypotheses, five control variables were included: age, international experience, international business assistance, size, and host countries pulling factors. Age – measured in terms of years in business (natural logarithm). International experience – number of years of international activity (natural logarithm). International business assistance – forms of support translated into specific measures of the government or other entities (Lages and Montgomery, 2005) (for further details see Appendix). Size – number of fulltime employees (natural logarithm). Host countries pulling factors – attractiveness factors related to markets to where companies seek to expand their operations (Etemad, 2004; Pangarkar, 2008; Cavusgil *et al.*, 2012) (see Appendix).

4. RESULTS

To assess the goodness of fit of the measurement model, absolute measures as the chi-square statistical significance (χ2) and the RMSEA (Root Mean Square Error of approximation) were used. The overall chi-square was found significant (χ^2 = 332.64; d.f.= 171; p<0.000) and the RMSEA = 0.046, which is an indicative factor of a good fit . Additionally, three incremental measures of fit were assessed: Comparative Fit Index (CFI=0.95), Incremental Fit Index (IFI=0.96) e Tucker-Lewis Fit Index (TLI=0.96).

Structural equation model

The conceptual model was tested using structural equation model. Results of this test suggest an acceptable fit of the model to the data: χ^2 = 383.68; d.f.=176; p<0.000; RMSEA = 0.052; CFI = 0.95; IFI = 0.96; TLI = 0.96. Table 1 depicts the estimates of the parameters and the T-values obtained for the various tested hypotheses.

Table 1. Structural model results

Hypotheses	β	T	Supp./Not supp.
H1a: International Diversification (Intensiy) → International Performance	0,29	3,75***	Supported
H1b: International Diversification (multinational scope) → International Performance	0,22	2,27*	Supported
H1c: International Diversification (multiregional scope) → International Performance	0,21	3,54***	Supported
H2a: International Diversification (Intensity) → Internationalization Experiential Knowledge.	0,29	5,5***	Supported
H2b: International Diversificati (multinational scope) → Internationalization Experiential Knowledge.	0,27	4,87***	Supported
H2c: International Diversificaton (multiregional scope) → Internationalization Experiential Knowledge.	0,12	2,39*	Supported
H3: Internationalization Experiential Knowledge → International Performance	0,39	6,79***	Supported

** p < 0,05; ** p < 0,01; *** p < 0,001. Two-tailed test.*

Table 2. Effect of the control variables

Control Variables	β	T
Age → International Performance	**0.01**	**0.22**
Size → International Performance	**0.09**	**1.85**
International Experience → International Performance	**-0.11**	**-1.69**
International Business Assistance → International Performance	**-0.04**	**-0.53**
Host Countries Pulling Factors → International Performance	**0.13**	**2.76****

** p < 0,05; ** p < 0,01; *** p < 0,001. Two-tailed test.*

Regarding the control variables used, as presented in Table 2, only "host country pulling factors" revealed a significant influence on international performance.

To assess the existence of the mediation effect of internationalization experiential knowledge in the relationship between international diversification and international performance we used the methodology adopted in Anderson and Gerbing (1988) and Lu *et al.* (2010). For that purpose, several nested models were analyzed (see table 3).

Table 3. Mediation effect of internationalization experiential knowledge in the "international diversification-international performance" relationship

	Model	χ^2	df	$\Delta\chi^2$	Δdf
A	Full model: direct and indirect effects (through the internationalization experiential knowledge) between international diversification and performance.	383,68	176	------	------
B	Full mediation; canceling all direct paths from international diversification to performance.	399,89	179	16,21*	3
C	No direct path from international diversification (intensity) to performance	394,29	177	10,61*	1
D	No direct path from international diversification (multinational scope) to performance.	388,97	177	5,29*	1
E	No direct path from international diversification (multiregional scope) to performance.	394,11	177	10,43*	1
F	No path from international diversification (intensity) to internationalization experiential knowledge	420,51	177	36,83*	1
G	No path from international diversification (multinational scope) to internationalization experiential knowledge	386,13	177	2,45	1
H	No path from international diversification (multiregional scope) to internationalization experiential knowledge	390,59	177	6,91*	1
I	No path from internationalization experiential knowledge to perfomance.	447,59	177	63,91*	1

** p < 0,05. Two-tailed test*

According to table 4, the "international diversification - performance" relationship is partially mediated by the internationalization experiential knowledge when it comes to the "intensity" and "multiregional scope" dimensions of international diversification, but, surprisingly, not in the case of "multinational scope".

Table 4. Mediation effect - hypotheses

Hypotheses - mediation effect:	Result
H4a: International Diversification (intensity) → Internationalization Experiential Knowledge → International Performance	Supported (partial effect)
H4b: International Diversification (multinational scope) → Internationalization Experiential Knowledge → International Performance	Not supported
H4c: International Diversification (multiregional scope) → Internationalization Experiential Knowledge → International Performance	Supported (partial effect)

5. DISCUSSIONS AND IMPLICATIONS

Results, significantly, suggest that more intense international diversification strategies or higher level of (multinational or multiregional) scope have a significant and positive effect on firm's international. That is, despite the inevitable costs and benefits entailed by the strengthening of international diversification (Contractor, 2007), this strategic option usually contributes to the optimization of the cost-benefit ratio, thus resulting in better international performance (Pangarkar, 2008; Beleska-Spasova and Glaister, 2010). Consistent with the conceptual model, the result analysis seems to enable the conclusion that a higher exposure and needing to deal with diversity in terms of countries, markets, market segments etc. enhances learning through international experience, reinforcing, therefore, the firm's internationalization experiential knowledge. Ie, company, during the process of its international learning, will turn the international experience gained in each market into internationalization experiential knowledge. This knowledge, getting embedded in routines and company structures, enhances problem-solving ability and the alternatives selection capacity, in the context of its international operations (Hsu and Pereira, 2008). Thus, this study supports and reinforces the findings of Eriksson *et al.* (2000a) and (Blomstermo *et al.*, 2004a).

On the other hand, results also suggest that internationalization experiential knowledge developed by the company through its international learning positively and significantly contributes to the strengthening of

international performance. Meaning that, by increasing its experiential knowledge of internationalization, the firm will perfect their skills to research, identify and embrace opportunities, either in new markets or in those in which the company has already been active (Eriksson *et al.*, 2000a; Blomstermo *et al.*, 2004a), resulting in a significant influence on performance. Hence, this confirmation contributes to an important line of research which includes studies such as Makino and Delios (1996), Autio *et al.* (2000) and Villar *et al.* (2014), since all of them concluded by the existence of a positive and significant relationship between organizational knowledge (studied in various forms) and firm performance.

Finally, we confirmed the existence of the mediation effect, even if in partial terms, of the experiential knowledge of internationalization in the relationships between both intensity and multiregional scope of international diversification and international performance of the company: However, such mediating effect, was not confirmed, neither full nor partially, when it comes to scope dimension in multinational terms. Thus, in general terms, it seems it can be stated that, in the case of the sample investigated, the effect on performance will be significantly more effective if the strengthening of international diversification is translated into a higher degree of experiential knowledge of internationalization, which, in turn, will influence performance more successfully. This conclusion is in line with the arguments of Buckley *et al.* (1988), since, here too, is concluded that international performance, more than direct and automatically stemming from "choices" made, it is the outcome of the competitiveness gains resulting from those 'choices', triggering, in turn, a performance improvement.

In conclusion, as generally accepted in the literature (e.g., Ghoshal, 1987; Vermeulen and Barkema, 2002; Beleska-Spasova *et al.*, 2012), our findings also remain an important support base to suggest that SMEs managers should start or strengthen the international diversification processes of their firms. In addition, this study also points out to the need for SMEs to leverage learning opportunities during their international business – in this study assessed by the accrual of general knowledge of internationalization - as a major net input to performance improvement.

Two main limitations of the study should be noted. First, its cross-sectional nature, since for many of the studied variables, involving processes over time, the use of longitudinal data, therefore (related to a time-series), would allow a more appropriate assessment of relations between the main variables. Second, studying international learning exclusively based on the acquisition of internationalization experiential knowledge can also be a limitation to the study, since, alone, this construct does not capture the diversity of aspects of the company's international learning. Concurrently, two suggestions for future studies are presented. First, a longitudinal study, also focusing on SMEs, once the scarcity of research work on the current theme is the major note. Second, other forms of organizational knowledge resulting from international activity, such as social knowledge (associated with relational firm's capital), technological expertise, market knowledge, institutional knowledge or customers knowledge could be studied (Eriksson *et al.*, 2000a; Yeoh, 2004; Sandberg, 2014).

Appendix – measurement scales

Internationalization experiential knowledge *(Adapted from Sandberg, 2014)*

Question: *Please indicate the extent to which your company, in the course of your international operations, has gained new knowledge/new skills in:*

(1 – Limited knowledge or skills; 5 – Extensive …)

- Supplying foreign customers.
- Adapting our products and services to meet the needs and wants of foreign customers.
- Marketing and sales of our products abroad.
- Adapting our organization to meet the needs and wants of foreign customers.

International performance *(Adapted from: Zou et al., 1998; Beleska-Spasova et al., 2012)*

Question: *Please indicate the extent to which you agree with the following statements*

(1 – Strongly disagree; 5 – Strongly agree)

- Has contributed significantly to our overall profitability
- Has generated a high volume of sales
- Has achieved rapid growth
- Has improved our international competitiveness
- Has strengthened our strategic position in the international market
- Has significantly increased our international market share
- Has been very successful
- Has fully met our goals and expectations.

International business assistance – control variable *(Adapted from: Lages and Montgomery, 2005)*

***Question**: Over the last five years, how would you rate the support to your company's international activities received from:*

(1 – None; 5 – Substantial)

- European Union
- Government (excluding EU support)
- Trade associations.

***Host countries pull factors - control variable** (Adapted from: Pangarkar, 2008; Etemad, 2004; Cavusgil et al., 2012)*

***Question:** Please indicate the degree of importance assigned, in overall terms, to the following factors as elements weighed in the decision to enter the various countries in which your company operates:*

(1 – Not significant; 5 – Absolutely crucial)

- Attractiveness in the medium / long term of the host country markets.
- Favorable government policies of the host country markets.
- Lower intensity of the competitive environment in the host country markets.
- Existence of capable partners in the host country markets.
- Access to resources (financial, natural, knowledge, etc.) in the host country markets.

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ORGANIC AND LOCAL FOOD MARKET – ALTERNATIVES OR COOPERATION POSSIBILITY?[1]

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ABSTRACT

The market for local and organic food is still a niche market in Hungary. Both offer consumers an alternative to the anonymous, globalized food supply chain. Yet local food and organic food seem to be overlapping and to some degree competing food concepts. The main focus is to explore the perception of Hungarian consumers towards local and organic food, using results from one research. We chose quantitative research as a method and carried out random interviews on a nationwide representative sample of 1000 respondents. Food of organic origin is considered somewhat important for 4 out of 10 respondents (38.9%), while the majority (59.8%) is neutral towards this aspect of products. At the same time, in the case of local products, origin is partially or wholly important for as much as 72.9% of the interviewees. We found it very important that 92.5% of respondents prefer to buy local foods versus imported foods (if sold at the same price), whereas the number drops to 81.3% in the case of organic foods. Our research reveals that the production and sales of local and organic foods is of very high (strategic) importance in our country as reflected in consumer needs. To that end producers, processors, traders and NGOs – in collaboration – need to create a quality product base, and a sales strategy that needs to be well communicated and reflect special characteristics.

KEY WORDS: niche market, globalization, consumer preferences, food marketing, strategy.

1. INTRODUCTION

Emerging interest in environmentally friendly, fresh and healthy food products can be detected nowadays. Local and eco food products seem to meet these consumer needs as a „natural" solution, both offer consumers an alternative to a globalized anonymous food supply chain (HAAS et al., 2013). Furthermore, an increase in interest in community building (both virtually and in real), and besides the central economic development interventions, raison d'etre of local economic development arise (MEZEI, 2006). Latter factors create the opportunity for independence, as well as for the establishment and maintenance of identity and economy which is based on local resources. In most countries a form of "food nationalism" is expressed, which leads consumers to give preference to products of national or regional origin (OPTEM, 2005).

In principal, similar concept was the basis for the organic farming in developed economies. In the last about twenty-twenty and five years organic production has undergone a transformation and a significant development in the whole world. Organic products, which were regarded first as "fashion products", have become a consumer trend. In the Western European and North American countries – serving as a model for Hungary – easily segmentable organic-food consuming groups have formed and organic products have become more regular for human consumption.

The market of organic products is quite small in Hungary. However, based on its development potential it has strategic importance (SZAKÁLY, 2004). According to GFK HUNGÁRIA (2005) lifestyle survey, about 65% of Hungarians consider organic foods the ideal nutriment of future. Researches of GERWIN (1998) and PANYOR (2007) shows that 60% of consumers have bought any kind of organic food in Hungary.

Unfortunately, there is no reliable data in Hungary regarding organic food traffic; participation of sales channels are only estimated. Based on these estimates, the traffic of organic food in Hungary is about 30-35 million Euros. This amounts to less then 1% of national food market traffic. The Hungarian organic food consumption level is even

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lower, only 0.5-1% of total consumption (CZELLER, 2009; GAUVRIT & SCHAER, 2013), however that of Danish and Austrian exceeds 5%, in fact, in the UK, it could reach 20-30% in case of dairy products (GERRARD et al., 2013). Another issue is that Hungary, organic production is export-oriented: the majority (90-95%) of the products (e.g. wheat, corn, sunflower seeds, pumpkin seeds, rye, soybeans, livestock) goes abroad unprocessed. Hungarian organic food scarcely appears in retail; consumers can only buy imported, sometimes lower quality products. The market has problems in both supply and demand: they distribute products that are not needed, and certain desired products are absent.

Even less information is available on the local food market in Hungary. Organic farming and organic food are terms, which are clearly defined and legally regulated, which is not the case for "local food". Local food has neither a clear environmental, neither production process nor health related definition, which can be a barrier for marketing (SZABÓ & JUHÁSZ, 2013; HINGLEY et al., 2010). In the 2008 Farm Bill the US Congress states that to be considered as „… locally or regionally produced agricultural food" the total distance has to be less than 400 miles from its origin or it has to be within the State in which it is produced (MARTINEZ et al., 2010). There is no common product assessment system or database, therefore, the estimation on the size of the market is even less accurate (and presumably lower!) than that of eco products.

Based on these trends and effects, our aim was to compare the consumer expectations between local products having niche characteristics and eco products, in order to highlight those marketing tools that would increase their proportion and turnover in retail trade.

2. MATERIALS AND METHODS

2.1. Sampling

In order to achieve the set objective, a nationwide representative questionnaire-based survey was given to 1000 participants in Hungary. Representativeness for regions and types of settlement was ensured by the applied quoted sampling method. The sample pattern met the quotas previously defined by the Hungarian Central Statistical Office (HCSO). On the assigned settlements a random walking method was used to ensure total randomness in selection (MALHOTRA, 2008). In the second step, the interviewed person within one household/family was selected by using the so-called birthday-key. The main point of the method is to select that consumer from the family members who has the appropriate age (18 or older) and whose date of birth (birthday) falls closest to the day of the interview (more simply: whoever had their birthday last). With this method randomness was ensured in the second step as well. Refusal was characteristic; the questions were answered in only 68% of the households.

Since random walking does not ensure the sample is a reflection of the entirety of the population (the number of the female and elderly respondents was higher than the national average), the sample of the people was corrected by multi-dimensional weighing factors (gender and age) (GRAFEN & HAILS, 2002). After these methods were applied, the sample was representative of the structure of the Hungarian population in all the four aspects (region, type of settlement, gender and age).

2.2. Analysis of the data

The assessment of the data was based on various mathematical-statistical methods (frequency, mean, standard deviation, chi-squared test, one-way analysis of variance) fitting to the topic of the research. The missing values were replaced by a sample mean in each case.

3. RESULTS AND DISCUSSION

3.1. Importance of the origin of local and organic foods

The first question touched upon the origin of the products: is it important for the consumer to know whether the desired product is organic, local or Hungarian?

Organic origin is considered somewhat important for 4 out of 10 respondent (38.9%), while the majority (59.8%) is neutral towards this aspect of products. At the same time, in the case of local products, origin is partially or wholly important for as much as 72.9% of the interviewees. It is worth noting that 62.9% of those who prefer ecologically farmed food products also consider local origin important. Yet, 48.1% of those who favour locally produced goods do not consider organic origin important at all (p=0.000).

Similar results were observed by others too: according to the findings of COSTANIGRO et al. (2011) attitudes associated with "local food products" are stronger than that of "ecological food products". The results of HAAS et al. (2013) also point to the conclusion that despite their divergent distribution channels, branding, pricing and labelling, organic and local food products are rivals on the American market. Otherwise, some Austrian results are quite promising: according to a survey conducted in Lower Austria, it is exactly this kind of duality that can turn an enterprise into a successful business (MILESTAD et al., 2010).

In Table 1 we organize consumer attitude towards importance of local produced foods according to level of education.

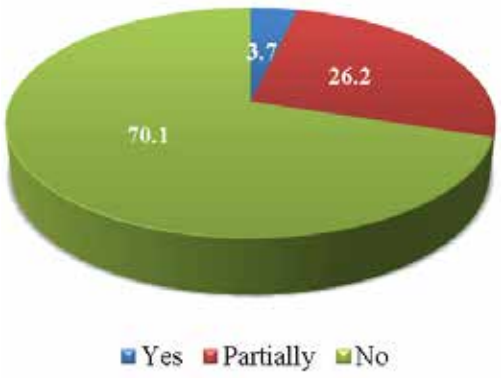
Table 1. Importance of local produced foods depending on education level of respondents

Answer categories	Elementary school		Vocational training		Highschool graduation		Higher degree	
	Head	%	Head	%	Head	%	Head	%
Partially	50	34.2	130	41.5	137	37.7	78	43.8
Yes	59	40.4	81	25.9	131	36.1	63	35.4
No	36	24.7	100	31.9	95	26.2	37	20.8
Don't know	1	0.7	2	0.6	0	0.0	0	0.0

Locally produced foodstuffs were valued most by tertiary education graduates. 79.2% of them indicated that the local origin of foodstuffs plays a major or minor role in their decision making. Approximately one third of skilled labourers replied that production location is an unimportant aspect of foodstuffs (p=0.016).

In our research, we also asked our respondents to rate how much they care for choosing organic products when buying food (Figure 1).

Figure 1: Willingness of respondents to actually buy organic food products, % (n=1000)



3.7% of the interviewees paid attention to put organic food products into their cart, and 10% insisted that organic origin is important for them. Consequently, somewhat more than one fourth of the respondents is only planning or would only like to buy the desired products, but due to certain obstacles they withdraw from doing so. Those, who replied with "yes" to organic products are predominantly women (36.0%), tertiary education graduates (39.9%), white-collar workers (41.9%), or have above average income (45.7% and 30.8%). The majority replied with "no" to this question too. The results shown on the above two figures indicate that in addition to the actual buyers, many other respondents consider organic origin an important factor.

To understand the underlying causes, we asked those who replied with "no" to specify the obstacles preventing them from buying organic products. The causes thus obtained are summarized in Figure 2.

The main cause of refusal is the relatively high price; two-third of the surveyed individuals cited this as an obstacle (63.3%). By summing the results associated with the different factors signalling scepticism, we obtain 79.5%, i.e., the most serious obstacle is the doubt of surveyed individuals about the authenticity and the alleged benefits of organic products. The third argument according to which it is hard to identify the products—problematic for one fourth of the consumers (27.5%)—might be most easily treated with communication tools. This also draws attention to the problem that distinguishing verified organic food products from normal goods is hard—even these days. Although there are local and EU regulations, consumers can hardly distance the designated "bio-" prefix of foods from that of biotechnological products. What is more, the Hungarian slang term for synthetic cannabinoids "biofű" might also give rise to dangerous associations among the lay consumers. As regards the background variables, the lack of scepticism towards and trust in the health benefits of organic product are correlated with one's level of education: lowly-educated respondents (up to primary school) and tertiary education graduates are the less sceptic (p=0.000) and the most trustful (p=0.026).

Figure 2: Causes for refusing organic products, % (n=701)

* More than one option was possible.

The next question dealt with those factors that have the largest impact on one's organic food purchase (Table 2). The respondents had to rate the impact of each individual factor on their purchase using a 1-to-5 interval scale (1—it has the smallest impact on me, …, 5—it has the greatest impact on me).

Table 2. The impact of the listed factors on purchasing decisions

Name	n	Mean	Std. dev.
Price of the product	402	4.04	1.411
Constant quality of the product	399	4.01	1.429
Health protective effect of the product	402	3.97	1.384
Tastes associated with the product	404	3.78	1.435
Origin of the product (local, import)	391	3.77	1.393
The whole family loves it	396	3.71	1.447
Label ensuring quality	392	3.66	1.472
Appearance of the product, its aesthetic	400	3.64	1.397
Label ensuring ecological origin	402	3.54	1.466
Habit	401	3.27	1.383
Brand of the product	397	3.10	1.409
Handy, practical packaging	397	3.06	1.377
Name of the production firm	397	3.03	1.440
I can get it anywhere	391	2.82	1.404
Promotedness of the product	396	2.44	1.378

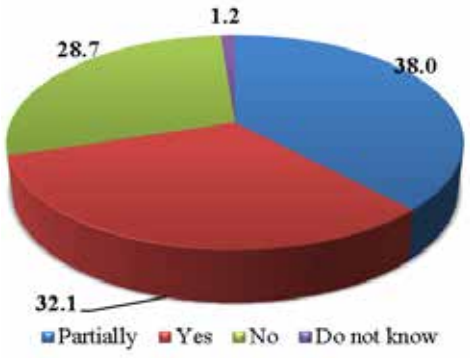
Our first observation is that as much as 40% of the respondent can be treated as somewhat competent in purchasing ecological food products. The 10% surplus compared to those who pay close attention to their purchases points to a significant latent demand; the purchasing decisions of this layer are subconsciously influenced by the ecological origin of products. Further, it is apparent that none of the listed factors achieved overwhelmingly high or low score, which means that the adjustment of individual factors will not have significant market impact. "Price"—also featured as a purchase obstacles—is the most influential factor on shopping decision, but the advantageous "constant quality" and "health benefit" factors are just following it. Based on the survey, the factors which have the smallest impact on shopping decisions are the degree of promotion, the accessibility of products and the name of the production firm.

The cause of this phenomenon might be that compared to regular products, consumers perceive organic ones as special, which do not land in their carts due to advertisements; while as regards the point of purchase, they demand that it must signal trust. This might be related to the branding of the production firms, since there are not any widespread organic brands in Hungary, and none of the firms aim at emphasizing their own name. The labelling of ecological products is only at the middle of the listing, which explicitly refers to the lack of information, and as a result it valorizes those aspects which aid identification (without taking the anomalies identified as the causes of refusal into account).

3.2. Sales channels of organic and local foods

The accounts of HAAS et al. (2013) posit that locally produced foodstuffs are primarily distributed via short food supply chains (SFSCs), i. e., farm shops, farmers' markets and local convenience stores. On the contrary, the largest proportion of organic food products in North America is available in super- and hypermarkets as well as discount stores. In Hungary, markets are the most important sources of locally produced foodstuffs (SZABÓ & JUHÁSZ, 2013), but such products are also available in certain grocery stores in urban areas and through vending machines. Since unipolar profile building is not common, in our study we surveyed the related opinions. Figure 3 summarizes the attitudes of participants towards the importance of having local stores specialized for organic foodstuffs.

Figure 3: The willingness to buy local foods at a store specializing in only local products, % (N=1000)

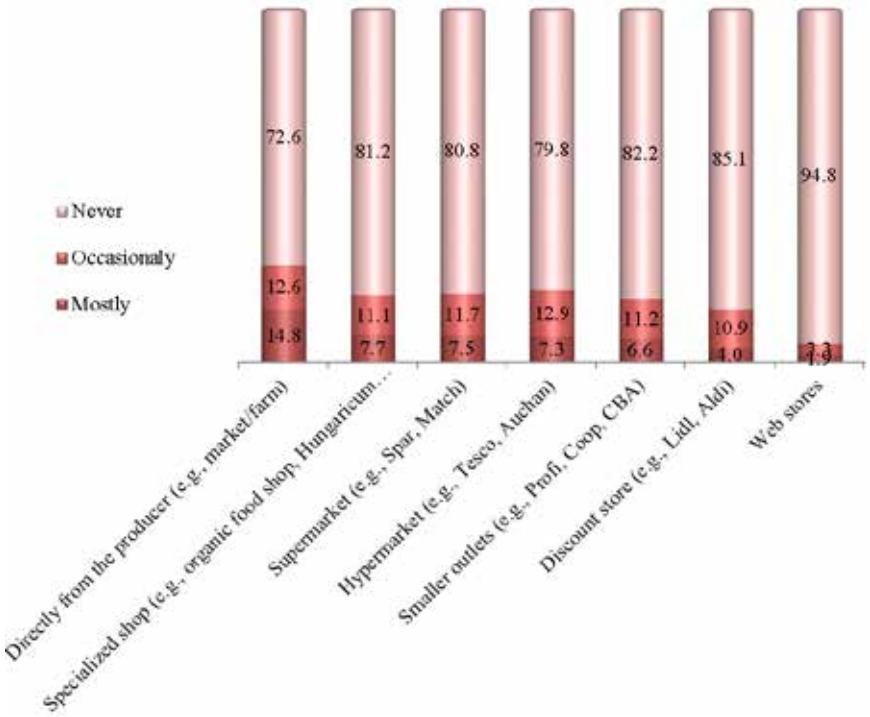


70.1% of respondents find important or partially important to buy local foods at a store specializing in only local products. This rate is comparable to the response for importance, only a slight difference could be observed. According to the result of these two questions there is a significant demand for a store where only local products purchased.

According to previous researches besides the relatively high price of organic products, availability is also a significant obstacle in distribution: every other customer face difficulties when it comes to finding distributors of locally produced foodstuffs (HODGSON, 2012), or when they have to distinguish local and non-local products or have to find the unusual sales locations (HAAS et al., 2013). Our results indicate that the communication of information is markedly important, as 94.4% of those who favour locally produced goods are planning to buy these products in the near vicinity of their homes.

Our next question was about the point of purchase. The interviewees were asked to mark for each listed channel whether they mostly, occasionally or never buy ecological foods products there (Figure 4).

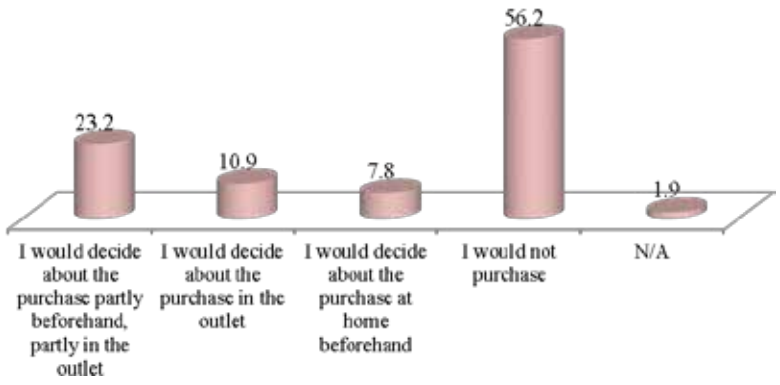
Figure 4: Frequency of choosing different outlet types for purchasing organic foods, % (n=1000)



Since organic foods have a sort of "trust product" character, it is not surprising that the largest portion of respondents usually buy these directly from the producers. For the consumers/ customers it is hard to verify each criteria of organic food products—e.g. that they are free of plant-protecting agents, pesticides or hormones—thus trust for the producers is valorized. After the producers, the various specialist shops follow, which were also shown to be popular in earlier studies (HAMM et al., 2002; SCHAAK, 2013, ZAGATA, 2012). The different super and hypermarkets and smaller outlets were almost equally popular, which refers to the increasing accessibility of organic products. In the recent years, organic foods began to appear on the shelves of different discount stores in Hungary, 14.9% of the respondents maintained that they buy products from these outlets with some frequency. Purchasing from web stores is the least favored option; the operators of such outlets should expect orders for specialties and for earlier tested products.

The next question in line aimed to investigate the location where ones' purchasing decisions are made (Figure 5).

Figure 5: Place of making purchasing decisions about organic food products, % (n=1000)



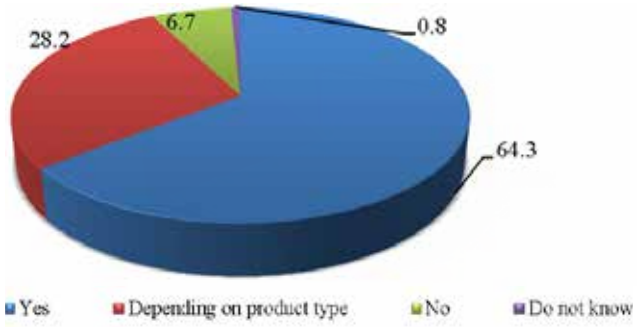
Those who buy organic food products, predominantly decide about their purchase in the outlets, which highlights the importance of in-store advertising in the case of these products. Packaging, placement, shelf facing and the various POP/POS tools might have a profound impact on sales. The opinion of HEMPFLING (2004) seems to reinforce our observation: "I don't like it when organic products are hidden in one of the corners. If this happens, I feel that I'm sorted out, and I withdraw from buying anything. "In case of direct sale, the appearance of the product (freshness and attractive packaging), the possibility to test it (taste it) and the recommendation of the producer might be useful.

3.3. Judgement of pricing for locally produced and organic foods

According to researchers, consumers are willing to pay premium prices for local and organically grown foods (GREBITUS, LUSK & NAYGA, 2013; YUE & TONG,2009). In the case of „organic" or „eco" labelling that means on average a 20% to 30% mark up, while the pricing for local products varies according to place and product category (SZENTE, 2009; HAAS et al., 2013).. Women are particularly willing to pay higher prices (GRACIA, DE MAGISTRIS & NAYGA, 2012). The main reasons that consumers pay higher prices include: freshness and supporting the local economy, in the case of local products, and in that of organic foods, rather, the lack of chemical additives and general health benefits (SZENTE, 2009; GREBITUS, LUSK & NAYGA, 2013).

During our research we asked consumers about suitable pricing for both types of product. Figure 6 shows that in the case of two equally priced similar products consumers would be inclined to buy the locally produced product versus an import of unknown origin.

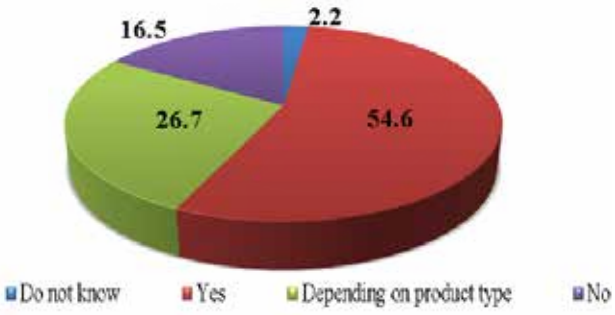
Figure 6: Willingness to buy locally produced foods compared to the same characteristics of other source foods, if the price is the same, % (N=1000)



64.3% of respondents are absolutely sure that in the case of equally priced similar products they would prefer to purchase the locally sourced one compared to ones of other origin. Of the remaining respondents, close to thirty percent of those surveyed tend to waiver depending on product type, and just 6.7 percent answered „No" or were undecided, how could be even cosmopolitan consumer or expect price differences according to origin.

Figure 7 shows consumer opinion regarding organic vs. similarly priced conventional foods.

Figure 7: Willingness to buy organic foods compared to foods with same characteristics and price

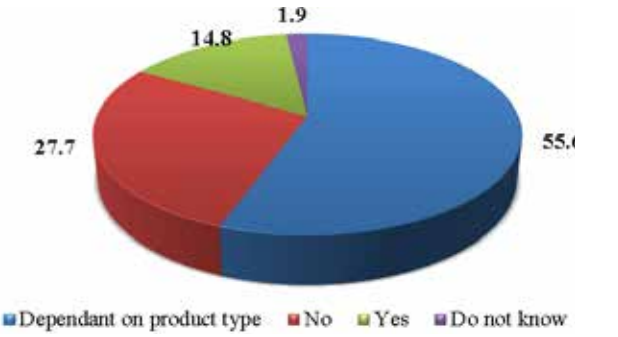


The case of organic foods paints a similar picture: 54.6% of respondents would choose organic products over standard ones if the prices were the same. A quarter of respondents would only choose organic goods for certain products (26.0%). 20% wouldn't buy organic even if the prices were the same as other foods.

We determined that local products are more attractive at parity pricing compared to organic goods, which could stem from the strength of scepticism surrounding organic products, as demonstrated by Figure 2.

Figure 8 shows that in the case of two products of similar characteristics consumers would sometimes choose the local product, even if it was more expensive than an imported one.

Figure 8: Willingness to buy locally produced foods compared to the same characteristics of other origin foods, if price of local product is higher, % (N=1000)



15% of respondents would be willing to spend more for a local product even if it was more expensive than an imported one, but that figure jumps to 55.6% in the case of certain products. This last figure is of special interest, as it indicates that there are certain product categories that consumers prefer to buy locally and, therefore, they are willing to spend more. It is of utmost importance that these products be available on the market consistently. Consumer insecurity is increased when local products are actually more expensive than imported ones. Comparatively, the category nearly doubles in size when we include the respondents that would pay more in specific cases. These connections demonstrate the importance of pricing on consumers' shopping practices.

In Table 3 we organize consumer attitude towards higher priced food according to level of education.

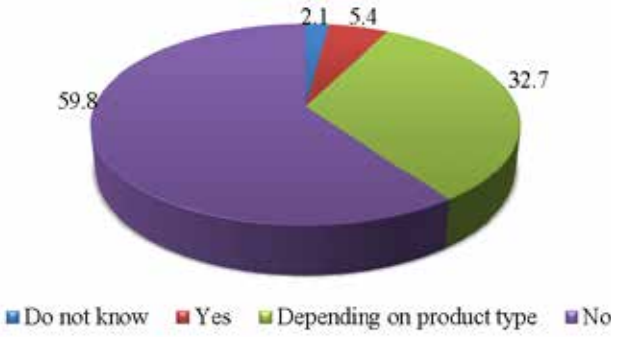
Table 3. Willingness to purchase locally produced, more expensive local foods compared to other origin depending on educational level of respondents (N=1000)

Answer categories	Elementary school		Vocational training		Highschool graduation		Higher degree	
	Head	%	Head	%	Head	%	Head	%
Yes	21	14.4	38	12.1	50	13.8	39	21.9
Depending on product type	71	48.6	166	53.0	217	59.8	102	57.3
No	48	32.9	103	32.9	91	25.1	35	19.7
Do not know	6	4.1	6	1.9	5	1.4	2	1.1

The results show that nearly a fifth of those with higher degrees would be willing to pay more for local goods. Of those with Elementary education about one-third would not buy more expensive local goods in the place of cheaper imported ones.

Figure 9 shows consumer willingness to spend more on organic products compared to standard products.

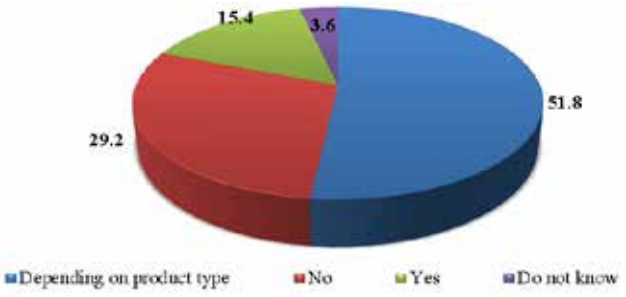
Figure 9: Willingness to purchase organic food if price is higher than conventional food, % (N=1000)



Here we find significant differences compared to the purchase of locally produced foods. Only a third of respondents would be willing to spend more on organic foods compared to locally produced ones, and only a tenth of those, who would purchase conventional products at similar price. Here we see the same phenomena, that certain products are worth more, making consumers happier to open their pocketbooks. From the point of view of market possibilities it is essential to identify these particular products! The number of those answering „no" was nearly tripled (59.8%), and compared to the results of the similarly priced products the „organic" scepticism is increasing.

We also surveyed whether it may help to distinguish between local organic products if they carried a certificate of origin. First we show the results of customer opinion regarding whether they would purchase a more expensive local product over an import if the local product carried a certificate of origin (Figure 10).

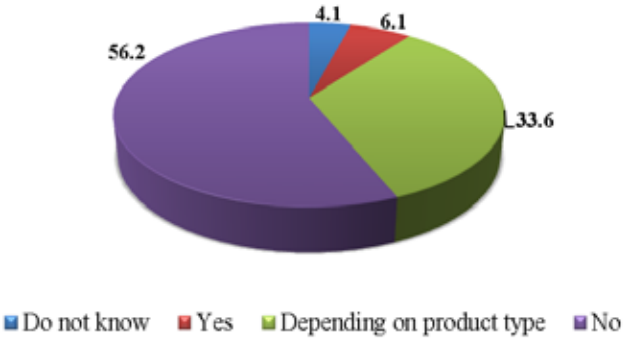
Figure 10: Willingness to purchase locally produced, more expensive local foods compared to those of other origin, if local food is marked with origin certification,% (N=1000)



Compared to the previous results there is perhaps a slight influence detected in cases where products display a certificate of origin, still the certificate must somewhat decrease consumer insecurity. However, based on the results, the inclusion of a certificate does not have much demonstrable effect.

We also tested whether the inclusion of an authenticity guarantee would increase consumer opinion of organic foods compared to those of other origins (*Figure 11*).

Figure 11: Willingness to purchase organic foods compared to those of other origin, if authenticity mark is use, % (N=1000)



There is not enough percieved increase in the value of organic products once they are labelled with a certificate of authenticity to warrant its use. All this indicates that certificates of origin or authenticity do not particularly influence consumers to pay more for a product.

4. CONCLUSIONS AND RECOMMANDATIONS

Our research reveals that the production and sales of local and organic foods is of very high (strategic) importance in our country as reflected in consumer needs. Currently, both market show niche market characteristics, however the proportion of responsive consumers is significant. To increase market potential producers, processors, traders and NGOs – in collaboration – need to create a quality product base, as well as alternative sales channels, and prices should approach consumer expectations. To do so, effective marketing communication tools are essential.

It is clear that locally produced and organic foodstuffs are competitors on the market and their target audience share common sociodemographic features (mostly female audience, mostly tertiary education graduates, white collar workers, above average income). While planning the marketing-mix for locally produced foodstuffs, increased attention should be assigned for the comprehensive and simplified distribution. To familiarize consumers with the relative high price, they should be informed about the transportation costs and the reliability of products. The obstacles posed by high prices and general scepticism towards organic foodstuffs should be demolished by raising awareness in consumers. To win the sympathy of consumers and possible future buyers, the communication of products should emphasize the higher quality embodied in the higher price, and people should be familiarized with the production circumstances. It also worth considering to co-join local specialties with the organic phrase, which might help consumers accepting the extra price, what is more, it might be the easiest way to win the trust of sceptics.

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RESEARCH ON STUDENTS' SATISFACTION WITH BANKING SERVICES

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ABSTRACT

The aim of the research was to investigate which banking services students' use, which banks they prefer, to define which dimensions or elements of banking services are important for them, and to determine the level of students' satisfaction with each dimension of the mentioned services. Finally, the research had to explore the overall level of students' satisfaction with banking services. Qualitative and quantitative researches have been conducted. Convenience sampling has been applied. Control categories were students aged from 18 to 26 years who use banking services and are full time students. The research was conducted in phases. In the first phase 12 in-depth interviews were conducted with the target group representatives. The second research step was used for questionnaire pilot-testing. In the last research stage the questionnaire was accurately completed by 281 respondents. The results show that students prefer big banks and that the almost half of the respondents, 49.82%, are completely satisfied with their banking services. The highest level of satisfaction is related to employees' dress code, although the respondents did not evaluate the dress code as an important element in offering banking services. The results showed that the important banking service element is the provision of service on time and in accordance with what was promised, as well as expertise and professional behaviour of employees. It is important to stress that the respondents are not satisfied with the speed of service delivery. A lower level of satisfaction is also related to banking fees. Furthermore, banks' working hours and the availability of an adequate number of ATMs was awarded with a lower average in satisfaction ratings. Since the mentioned elements are relatively important to respondents, banks should make the necessary improvements in order to ensure greater student satisfaction with banking services..

KEY WORDS: cryptocucustomer satisfaction, customer satisfaction survey, elements of customer satisfaction.

1. INTRODUCTION

Customers' satisfaction is subjective. It is regarded as the opinion or state of mind that customers have about the company. Customers' satisfaction is a result of comparison between customers' expectations and the use of particular product or service.[1] Satisfaction implies customer's postive feeling on the used product that gives him confirmation of making a right decision when he chose between different possibilities. A customer will be satisfied if a product or service is in line with their expectations or dissatisfied if the experience is under expected levels.[2] Due to the existence of numerous definitions of satisfaction, in the continuation there are alternative definitions of service satisfaction.

Table 1. Alternative definitions of service satisfaction

APPROACH	DEFINITON
Normative definition of satisfaction	Compares the results with those which are acceptable in a certain culture.
Definition of equalisation	Compares the results achieved through social exchange. If unequal, the side which was less successful is dissatisfied.
Normative standard definition	Expectations are based on what the customers believes he or she should receive – dissatisfaction occurs when the actual outcome is different to the standard expectation.
Procedural definition of correct behaviour	Satisfaction is the reflection and function of a customer's belief that he or she was treated the right way.

Source: Ozretić Došen, Đ. (2010.) Osnove marketinga usluga, Zagreb: Mikrorad, pp. 81.

[1] Kos, A., Trstenjak, M., Kralj, A. (2011.) Zadovoljstvo kupaca – kako ga mjeriti? Hrčak: Zbornik radova Međimurskog veleučilišta u Čakovcu, Vol.2, No.1 paper was supported by the TÁMOP-4.2.1.C-14/1/KONV-2015-0008 project.

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As a result of the comparison between the performance of products or services with the expectations, the client can be enthusiastic, satisfied or dissatisfied. The relationship between the three possible levels of customers' satisfaction is shown in Table 2. In the situation when the product is above customers' expectations occurs positive confirmation or negative confirmation when the product's performance is below expectations.[3]

Table 2. Levels of customers' satisfaction

Experience/ Performance	Customer's experience	Satisfaction level	Result
Actual value of a product or service	Better than expected	Enthusiasm	The customer will say positive things about the product and he or she will become loyal.
	In accordance with expectations	Satisfaction	The customer will say positive things about the product.
	Worse than expected	Dissatisfaction	The customer will choose a competitor if one is available.

Source: Adapted from Vranešević, T. (2000.) Upravljanje zadovoljstvom klijenata. Zagreb: Golden marketing, pp. 192.

The literature points out that there are two types of satisfaction, and these are cumulative satisfaction and satisfaction that is the result of a specific transaction. Parasuraman et al. (1994) describes the total (cumulative) satisfaction as a function of unit satisfaction.[4] Furthermore, cumulative satisfaction is described as the total user experience with a product or service over a longer period of time while unit satisfaction indicates that satisfaction is the result solely of a single transaction or a single product purchase.[5] Therefore, customers' satisfaction is a value that can be determined for each transaction between the user and the company, but also on the basis of a comprehensive, long-term use of products or services.[6]

There are many methods and techniques that are used for a better understanding of customers' satisfaction. Questioning as a method of measuring satisfaction involves asking questions that may be in verbal or in written form. The advantage of this method is its ability to collect various data on customers' satisfaction that may be related to the past, present, future, and it is generally possible to collect large amounts of data - including attitudes, opinions and behavior intentions.[7] Questioning as a method for measuring customers' satisfaction is most often carried out using a questionnaire as an instrument of research.[8] Customers' satisfaction is influenced by numerous factors. Some of them are characteristics of a product or service, the perception of their quality, price, situational and personal factors.[9] It is important to stress that the dimensions of customers' satisfaction vary depending on the market segment that is being observed. For example, students as a specific segment of the market are affected by objective parameters such as height and transparency of prices and also subjective parameters such as employees, waiting time, communication, quality of service and so on.[10] Furthermore, it is considered that their satisfaction can be increased by improving the quality of service, characteristics such as appropriate bank and ATM locations, the range of products, fees and interest rates, and successful system for handling customers' complaints.[11]

Various experts point out different dimensions of customers' satisfaction, but all agree that the impact of the quality of services to the satisfaction is the most important.[12] Accordingly, experts concentrate on researching the link between the quality of service and customers' satisfaction. For example, Beerli, A., Martin, JD, Quintana, A. did the study in which the results demonstrated the existence of exclusively positive and statistically significant relationship between service quality and customers' satisfaction.[13] The quality is subjectively determined and varies from client to client and depends on their age, income, lifestyle, and education. One commonly used model for measuring the quality of service is SERVQUAL model developed by Parasuraman et al. (1988). It is a conceptual framework for researching the quality of service that is based on

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[16] Nefat, A., Paus, N. (2008): op.cit.

the difference between expected and obtained values. If the expectation is greater than the values obtained – the service is bad, and vice versa, if the resulting value is greater than expected then the service is good.[14] SERVQUAL model enables identification of the services' dimensions without which the service could not ensure the quality and thus customers' satisfaction.[15]

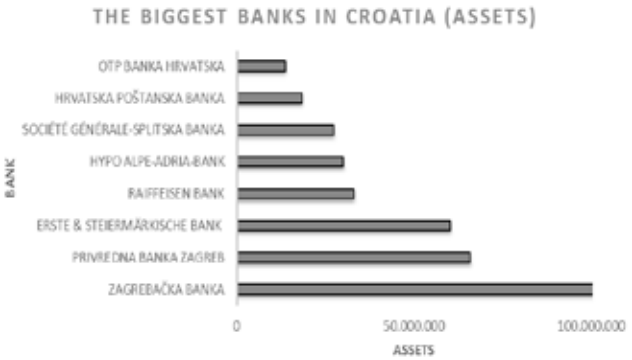
SERVQUAL model is based on five dimensions [16]

- Reliability
- Assurance
- Empathy
- Responsiveness
- Tangibility[17]

Lately, financial institutions are turning to the new market segments in order to find new customers. Banks have realized that students are an extremely interesting and potentially highly profitable segment in the long term. In Croatia, banking services for students have appeared in the last ten years, while in developed countries such as the United Kingdom, banking services for young people exist more than 40 years.[18] According to the Agency for Science and Higher Education the number of students in Croatia, in the academic year 2013/2014 amounted to 178,676 students.[19] The reason for the great interest of banks in student segment is the expectation of their well-nigh employment and above-average incomes.

Banking services for students include student loans, giro account, current account, various forms of students' savings account, internet banking, mobile banking, credit cards and additional benefits that are given to students disposition. Due to increasing use of technologically aided banking services, banks with traditional channels have begun to offer their financial products and services via the Internet as an alternative distribution channel. Thus, the banks can ensure the loyalty of its customers, reduce operating costs and increase business productivity. Online and mobile banking is interesting to students (and youth in general) because it allows them access to services anytime and anywhere, ease of use, time and cost savings, transparency of information, the possibility of comparing tenders, etc.[20] Also, students use different types of bank cards that allow them easier management of their own resources. A survey conducted in 2011 in the Republic of Croatia showed that 65.62% of students use at least one or more card products as a means of payment.[21]

Figure 1. The biggest banks in Croatia (assets)



Source: Adapted by authors from the website of Croatian National Bank

Table 3. Type of service inteded for students

BANK	TYPE OF SERVICE INTENDED FOR STUDENTS				
	Student loans	Giro account	Current account	Students' savings account	Package of services
Erste & Steiermarkische banka	✓	✓	✓	✓	✓
Hrvatska poštanska banka	✓	✓	✓		✓
Hypo Alpe Adria banka		✓	✓		
Otp banka	✓	✓	✓	✓	✓
Privredna banka Zagreb	✓	✓	✓		✓
Raiffeisen banka		✓	✓		✓
Splitska banka - Societe Generale	✓	✓	✓		✓
Zagrebačka banka	✓	✓	✓		✓

Source: Authors

[17] Činjarević, M., Tatić. K., Avdić, A. (2010.) An integrated model of price, service quality satisfaction and loyalty: An empirical research in the banking sector of Bosnia and Herzegovina. Hrčak: Ekonomska istraživanja, Vol. 23, No. 4

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[21] Ozretić Došen, Đ., Vajda, B. (2011): op.cit.

Based on information shown in Table 3, it is possible to conclude that only two banks in Croatia offer services that are fully adapted to the students, such as Erste & Steiermarkische and Otp Bank. Those two banks stand out for offering a special package of student savings.

2. METHODOLOGY

Qualitative and quantitative researches have been conducted. Convenience sampling has been applied. Control categories were students aged from 18 to 26 years who use banking services and are full time students. The research was conducted in phases. In the first phase 12 in-depth interviews were conducted with the target group representatives. Research results show there are 15 banking service features which influence students' satisfaction:

- Service fees and charges
- Transparency of service fees and charges
- Delivery of services without errors
- Delivery of services on time and as agreed upon
- Transparency and clarity of bank statements
- Quality customer service
- Upfront information about when and how a service will be delivered
- Understanding students' needs
- Expert and professional staff
- Polite and friendly staff
- Appropriate staff uniform
- Comfortable interiors/exteriors to branches
- Service delivery speed (short queues)
- Convenient branch opening hours
- Accessible cashpoints close to home with free cash withdrawals

The second research step was used for questionnaire pilot-testing. In the last research stage the questionnaire was accurately completed by 281 respondents. Table 4 shows age structure of the respondents.

Table 4. Sample stucture - Age

Age	%
18-20	21%
20-22	35%
22-24	29%
24-26	15%

Source: Authors

Table 5 shows the structure of the sample by gender, from which it is possible to conclude that the majority of respondents consists of female students. It should be noted that the actual structure of student population of the University of Zagreb is dominated by female students.

Table 5. Sample stucture - Gender

Gender	%
M	27%
F	73%

Source: Authors

3. RESULTS

The obtained data was analyzed using Microsoft Office Excel 2010 and Gretl statistical software. The data shows that the most used services are giro and current account. On the other hand, at least used banking services are student loans.

Table 6. Services used by students

Services	%
giro account	81,85%
current account	75,09%
internet banking	52,31%
mobile banking	46,62%
package of services intended for students	40,57%
savings accounts	18,15%
student loans	2,49%

Source: Authors

According to the collected data students prefer big banks. 77.94% of respondents are clients of the two largest banks measured by the size of total assets, of which 49.47% are clients of Privredna banka Zagreb, and 28.47% are clients of Zagrebačka banka. This information is very interesting considering the fact that Zagrebačka banka is by total assets the largest bank in Croatia. Although Privredna banka Zagreb is not the largest bank, it is significantly ahead of Zagrebačka banka measured by the number of students' - bank customers.

Table 7. Banks – overall students' satisfaction

Level of satisfaction	%
fully satisfied	49,82%
partially satisfied	30,96%
neither satisfied nor dissatisfied	13,17%
partially dissatisfied	4,98%
fully dissatisfied	1,07%

Source: Authors

Based on the research and the data from Table 8 it can be concluded that there is a medium level of students' satisfaction with service fees and charges. Its average grade is 3.69. Respondents point out that the fee for the

use of banking services is important and it is evaluated with average grade of 4.37. The standard deviation from the average grade is 0.83, which means that the majority of respondents agree about the great importance of service fees and charges.

Table 8. Service fees and charges

Indicator	Level of satisfaction	Level of importance
Average grade	3,69	4,37
Standard deviation	1,18	0,83
Coefficient of variation	32,02%	19,05%
Median	4	5
Mod	5	5
Interquartile range	2	1
Coefficient of quartile deviation	25%	11,11%

Source: Authors

Table 9. Transparency of service fees and charges

Indicator	Level of satisfaction	Level of importance
Average grade	3,70	4,22
Standard deviation	1,12	0,84
Coefficient of variation	30,29%	19,96%
Median	4	4
Mod	4	5
Interquartile range	2	1
Coefficient of quartile deviation	25%	11,11%

Source: Authors

As for students' satisfaction with transparency of service fees and charges it is visible that there exists a medium level of satisfaction. The students evaluated the dimension as relatively important due to the average grade, which is 4.22. The range of the central 50% of the data is 1, or 11.11% measured by coefficient of quartile deviation.

Table 10. Delivery of services without errors

Indicator	Level of satisfaction	Level of importance
Average grade	4,23	4,60
Standard deviation	0,93	0,68
Coefficient of variation	22,05%	14,77%
Median	4	5
Mod	5	5
Interquartile range	1	1
Coefficient of quartile deviation	11,11%	11,11%

Source: Authors

Results presented in Table 10 shows students' satisfaction with delivery of services without errors. The mod, or most often rating is 5, which on the one hand means completely satisfied students, while on the other hand means a very great influence to students' satisfaction.

Table 11. Transparency and clarity of bank statements

Indicator	Level of satisfaction	Level of importance
Average grade	4,02	4,36
Standard deviation	1,07	0,81
Coefficient of variation	26,65%	18,63%
Median	4	5
Mod	5	5
Interquartile range	1	1
Coefficient of quartile deviation	11,11%	11,11%

Source: Authors

Table 12. Quality customer service

Indicator	Level of satisfaction	Level of importance
Average grade	4,37	4,59
Standard deviation	0,86	0,67%
Coefficient of variation	19,61%	14,61%
Median	5	5
Mod	5	5
Interquartile range	1	1
Coefficient of quartile deviation	11,11%	11,11%

Source: Authors

Table 13. Upfront information about when and how a service will be delivered

Indicator	Level of satisfaction	Level of importance
Average grade	4,16	4,48
Standard deviation	0,90	0,75
Coefficient of variation	21,68%	16,76%
Median	4	5
Mod	5	5
Interquartile range	1	1
Coefficient of quartile deviation	11,11%	11,11%

Source: Authors

Students are more satisfied with quality customer service than the upfront infromation about when and how a service will be delivered.

Table 14. Understanding students' needs

Indicator	Level of satisfaction	Level of importance
Average grade	4,10	4,45
Standard deviation	0,97	0,74
Coefficient of variation	23,58%	16,64%
Median	4	5
Mod	5	5
Interquartile range	1	1
Coefficient of quartile deviation	11,11%	11,11%

Source: Authors

When considering the satisfaction of understanding students' needs average grade amounts 4.35. The median, is 4, which means that the first 50% of the respondents awarded grade 4 and less, and the remaining 50% grade 4 and higher.

Table 15. Expert and professional staff

Indicator	Level of satisfaction	Level of importance
Average grade	4,35	4,63
Standard deviation	0,90	0,60
Coefficient of variat ion	20,65%	12,85%
Median	5	5
Mod	5	5
Interquartile range	1	1
Coefficient of quartile deviation	11,11%	11,11%

Source: Authors

Observation of the importance and satisfaction of students with expertise and professionalism of staff on one side and politeness and kindness of the staff on the other side can lead to conclusion that students are equally pleased and think that mentioned dimensions are equally important.

Table 16. Polite and friendly staff

Indicator	Level of satisfaction	Level of importance
Average grade	4,37	4,60
Standard deviation	0,90	0,65
Coefficient of variation	20,62%	14,05%
Median	5	5
Mod	5	5
Interquartile range	1	1
Coefficient of quartile deviation	11,11%	11,11%

Source: Authors

Table 17. Appropriate staff uniform

Indicator	Level of satisfaction	Level of importance
Average grade	4,68	3,23
Standard deviation	0,64	1,33
Coefficient of variation	13,67%	41,02%
Median	5	3
Mod	5	3
Interquartile range	0	2
Coefficient of quartile deviation	0%	33,33%

Source: Authors

According to the results, students are satisfied with appropriate staff uniform and comfortable interiors/ exteriors to branches, but those elements are not considered particularly important. The lack of importance of tangible dimension confirms the level of importance with average grade 3.23, and for the comfortable interiors/ exteriors to branches 3.49. In both cases there is a significant deviation of the average value as the cofficient of variation exceeds the value of 30% which is considered as an unusual deviation from the average grade.

Table 18. Comfortable interiors/exteriors to branches

Indicator	Level of satisfaction	Level of importance
Average grade	4,35	3,49
Standard deviation	0,81	1,12
Coefficient of variation	18,53%	32,25%
Median	5	4
Mod	5	3
Interquartile range	1	1
Coefficient of quartile deviation	11,11%	14,29%

Source: Authors

Table 19. Service delivery speed (short queues)

Indicator	Level of satisfaction	Level of importance
Average grade	3,34	4,44
Standard deviation	1,18	0,78
Coefficient of variation	35,40%	17,51%
Median	3	5
Mod	4	5
Interquartile range	1	1
Coefficient of quartile deviation	14,29%	11,11%

Source: Authors

Students are not fully satistifed with service delivery speed. The average grade is 3.34, which indicates a medium level of satisfaction. Standard deviation is 1.18 or relatively high 35.40%. Furthermore, the median is 3, which means that 50% of respodents graded service delivery speed with 3 and less, and the remaining 50% grade it 3 and higher. The most commonly assigned grade is 4.

Table 20. Convenient branch opening hours

Indicator	Level of satisfaction	Level of importance
Average grade	3,74	4,30
Standard deviation	1,09	0,88
Coefficient of variation (%)	29,16%	20,38%
Median	4	5
Mod	4	5
Interquartile range	2	1
Coefficient of quartile deviation	25%	11,11%

Source: Authors

There is a medium level of students' satisfaction with convenient branch opening hours. The level of importance is high – average grade amonuts 4.30 with standard deviation of 0.88.

Table 21. Accessible cashpoints close to home with free cash withdrawals

Indicator	Level of satisfaction	Level of importance
Average grade	3,80	4,50
Standard deviation	1,20	0,80
Coefficient of variation	31,69%	17,72%
Median	4	5
Mod	5	5
Interquartile range	2	1
Coefficient of quartile deviation	25%	11,11%

Source: Authors

Although students find accessible cashpoints close to home with free cash withdrawals an important feature of banking services, they are not completely satisfied. The average level of satisfaction is 3.80. Coefficient of quartile deviation varies in the range of 25%.

3. CONCLUSION

Previously presented results show that students are partially satisfied with banking services. The highest level of satisfaction is related to employees' dress code. Even though there is a high satisfaction with this dimension, students did not evaluate the dress code as an important element in offering banking services. Hereof, it is necessary to observe the students' satisfaction with dimensions that have high level of importance such as provision of service on time and in accordance with what was promised, as well as expertise and professional behaviour of employees. On the other hand, students are the least satisfied with the speed of service delivery, banking fees, banks' working hours and the availability of an adequate number of ATMs. Since the mentioned elements are relatively important to respondents, banks should make the necessary improvements in order to ensure greater students' satisfaction with banking services.

Every research has certain limitations. In this case, limitations are related to the use of convenience sampling. Also, there is a small number of satisfaction studies which concentrate on exclusively student population. However, as most authors concentrate on researching service quality and its impact on customers' satisfaction it should be noted that the specificity of this study is that it includes a number of features that have an impact on students' satisfaction. Furthermore, apart from the traditional dimensions of service quality shown in SERVQUAL model, this study includes the dimensions of service accessibility such as opening hours and the availability of an appropriate number of ATMs. In addition, a special contribution of this paper is the focus on student population as an interesting and potentially highly profitable market segment.

This research applies several recommendations for managers that are primarily related to the student's satisfaction ensurance. Due to low satisfaction with the service delivery speed, banks should reduce the waiting time in line and offer more services that can be done outside the branch. Therefore, banks should put the emphasis on online banking that apart from outside the branch may have application inside the branch. Thus, while waiting, students would be able to observe different online content and customized offers as well as the information on student savings, credit cards, student loans calculators or similar financial products. Furthermore, the presence of students in banks could be used to encourage students to update information about their financial preferences, wishes and needs for which they would be awarded, and on the other hand, banks could use collected data to customize services.

Recommendations for future research of students' satisfaction with banking services include use of random samples to ensure greater representativeness and reliability of results, the participation of a larger number of respondents from other universities and adapting the dimensions of service quality to banking industry. Further research should also examine the details on expected service delivery speed, fees that students are willing to pay, opinions on the appropriate availability of ATMs and other areas of interest.

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