Brand Importance across Product Categories in the Czech Republic, the Slovak Republic and the Russian Federation

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ABSTRACT

Purpose: Customer loyalty is an important and complex aspect of the market environment. This study aims at analysing the significance attached by different customer groups to brands in particular product categories within the Fast Moving Consumer Goods sector and to enhance existing knowledge in this field.

Methodology/Approach: This study is based on primary data gathered through a consumer survey that was consistently carrried out in the Czech Republic, the Slovak Republic and the Russian Federation during November 2015. Different quantitative and statistical analysis methods and tests are applied. Logistic regression and average partial effect estimation form the main base for conclusions presented.

Findings: This study focuses on two key research topics: First, we describe how much does a perceived brand importance differ across various product categories. Second, we identify and quantify the influence of important socio-demographic and lifestyle factors that affect the potential for brand loyalty across different product categories. Main findings are highlighted and interpreted.

Research Limitation/implication: For the three countries involved, this study describes the topical situation at the time of the survey. In the coming years, repeated surveys might identify changes and trends in customer behaviour.

Originality/Value of paper: This paper is based on primary data, consistently gathered across three countries. By means of advanced statistical analysis, the authors provide comprehensive quantitative output that may be used for immediate marketing purposes and for further scientific research.

Category: Research paper

Keywords: product categories; brand; loyalty; customer; FMCG

1 INTRODUCTION

One of the basic marketing activities may be described as efforts made by one participant – typically a corporate entity – to attract consumers´ attention towards offered products and services. Building customer relations is not a one-off operation, but a continuous process with many follow-up steps and repeated activities. In order to properly analyse customer relations, or even loyalty (which is a higher degree of connection with customers, based on their positive attitudes towards a brand), it may be useful to mention two elementary factors that marketers have to deal with.

The first step is to trigger customers´ motivation for buying. The so-called USP (Unique Selling Proposition) is a parameter, or a complex of parameters, presented by a seller and perceived by customers as the significant positive differentiator from any competing offers. The other, equally important step is to retain customers´ interest, i.e. to achieve and secure repeated purchases that are based on sufficient and sustained differentiation towards competitors. Relevant research papers indicate existing relationships between brand consciousness, brand preference, brand sensitivity, and brand importance aspects, yet significant knowledge gaps exist in this field (e.g. Zablah, Brown and Donthu, 2010).

The question of loyalty is especially important in the Fast Moving Consumer Goods (FMCG) sector, often labelled as the non-durable goods. Customers' retention in this sector is very important and it directly influences corporate profitability (e.g. Buckinx and Van den Poel, 2005). The purchasing cycle in this sector is considerably short and the influence of externalities and macrofactors is low. Managers of market-oriented companies are well aware of the high value of customers who make repeated purchases. Customers´ long-term positive attitudes towards a brand are called customer loyalty. This loyalty can be influenced by various factors. An important part is played by individual customer´s emotions and social environment. For example, when using the products or services, customers may want to relate themselves to a certain reference group, either associatively (a group that the customer wants to be included in), or dissociatively (a group that the customer wants to differ from).

Strengthening of customer loyalty is generally motivated by an expected increase in corporate profits, both short-term and long-term. Customer loyalty towards a particular brand is frequently stimulated by specific marketing tools, such as loyalty programs. Present-day loyalty programs accentuate continuous, uninterrupted relations with customers. Long-term connections foster relational dynamics and enhance the positive impact of trust, commitment, and involvement in use (Grayson and Ambler, 1999, p.132).

This paper deals with customer loyalty towards various product categories within the FMCG sector. Our approach is based on the assumption that some product categories may be characterized by a stronger tendency to create loyalty bonds, as opposed to other product categories with weaker bonds. So far, consumer perceptions and preferences with respect to brand categories have received little

attention in the academic research literature (Ghose and Lowengart, 2013, p.4). Compared to preceding studies on this topic, we provide additional insight by extending the focus from our home country (the Czech Republic) to the Slovak Republic and the Russian Federation as well. Our approach secures consistency in data gathering and subsequent quantitative analyses - a crucial factor for presenting and comparing results across different states.

This paper is organized as follows: Chapter 2 contains a brief literature review that is oriented towards brand importance aspect along diverse product categories. In chapter 3, we formally postulate our main research questions. Chapter 4 provides information on the methodology applied and specific data handling issues. Chapter 5 presents the interpretation of the research results and related statistical tests. The last section concludes our paper, along with the list of references.

2 PRODUCT CATEGORIES AND BRAND IMPORTANCE IN LITERATURE

Customer loyalty and its many aspects make for some of the most important present-day tools of marketing. At the same time, there is a long marketing history, dating back to 1940s. This may be observed from the following quotation: When loyalty is considered in relation to specific brands, a fairly high degree of loyalty exists (Guest, 1944). The loyalty concept was refined and developed in 1950s, with focus on the behavioural aspects of loyalty (e.g. Cunningham, 1956). Later on, the loyalty concept appears repeatedly in literature. Among others, Bennet (2001) describes attitudinal brand loyalty and its strong impact on the behavioural brand loyalty. In the middle of the 20th century, loyalty was approached as a unidimensional concept, defined by the measurement paradigm adopted by the researcher. Nowadays, loyalty is perceived as a multi-dimensional rendition by the vast majority of marketing practitioners and researchers (see e.g. Rundle-Thiele, 2005).

Customer loyalty is an inherently sensitive phenomenon. Many factors exist that may influence customer behaviour and they may be summarized using various types of definitions. Loyalty can be described as a deeply held commitment to rebuy preferred products or patronize a service consistently in the future (Oliver, 1999, p.34). Also, it is very firmly linked to satisfaction. For example, Sambandam and Lord (1995) present research results that indicate less concern with seeking alternatives in customers who have found a service they enjoy and continue to use. Customer loyalty is the result of mental processes taking place in the customers' minds. In literature, loyalty formation is often described as a multistep process. For example, Oliver (1999, p.35) describes loyalty as a three-phase process: In the first phase, customers prefer a brand to its alternatives. In the second phase, the liking of the brand as based on satisfying usage occurrences has developed, and the third phase is defined by a specific level of commitment to repurchase. Similar approaches may be identified in research

papers published by significant and reputable companies. For example, the SAS company frequently points to the fact that customer satisfaction is strongly interrelated with brand affinity (SAS, 2014).

Marketing professionals often emphasize that loyalty is closely connected to trust. Trust is sometimes described as customer´s willingness to face the risk of a new purchase, based on a previous positive experience (e.g. Lau and Lee, 1999). Thus, Business to Consumer (B2C) marketers rely on brands to build the desired relationships. Therefore, brands serve as an important link between producers (companies) and their customers.

Loyalty may also be described as a pyramid built up of several tiers. Repeated purchases make for the first step, but they do not necessarily indicate loyalty, as re-purchases may be induced by many factors, like geographical locality, absence of competitors etc. Customer satisfaction can be considered as the second step and loyalty is at the top of the pyramid reflecting the stages of brand attitude in customers' minds. Loyalty is intrinsically mirrored in customers' behaviour and it is therefore transmitted to their milieus (see e.g. García Gómez, Gutiérrez Arranz and Gutiérrez Cillán, 2006). Quantitative preference analysis approach may be used to identify significant attributes that consumers use to develop their specific attitudes towards particular brand categories. Naturally, diverse drivers could be salient for different brand categories (Ghose, Lowengart 2013, p.7.)

Brand loyalty can be studied from many perspectives. Some analyses emphasize the role of loyalty programs (see e.g. Meyer-Waarden, 2007), other focus on situational loyalty that is related to events such as annual purchases bound with specific occasions (see e.g. McMullan and Gilmore, 2008). All such loyalty-focused studies should be focused on brands, because customer loyalty is tied to particular products, product groups or services. Some product categories may be characterized by their capacity to induce customer loyalty towards a given brand easily (see e.g. Oliver, 1999) while other categories may lack this feature. The general importance of brands is based on the fact that brands have a potential to elicit positive emotional responses in the average customer, as a result of being used. (see e.g. Chaudhuri and Holbrook, 2001). Both category and brand/product marketing activities may influence consumers into purchasing specific brands or products and to be loyal toward them (Huy and Olsen, 2013, p.594).

3 RESEARCH FOCUS

All the above mentioned aspects of loyalty considered, our research focuses on contributing to the existing knowledge by providing stratified quantitative information about the loyalty potential of brands in selected product categories for different sociodemographic groups of consumers and across three selected countries/economies. The potential magnitude of the power that attracts customers to brands is important, as marketers need to know what amount of a customers' purchases come their way in terms of actual and potential sales (Garland and Varey, 2006). From the marketers´ perspective, it is crucial to know

(i.e. to have access to relevant estimates) whether there are any gender differences in brand loyalty, whether the potential for brand loyalty in a given product category varies along standard sociodemographic factors (nationality, age, education) and if factors such as lifestyle preferences play any significant role.

Given the above mentioned facts, we use product categories as the basic unit of analysis in this study. It is common in marketing that a virtual funnel is used for classification of brands and that brands are clustered into generally defined FMCG categories or sectors. Whenever quantitative or Likert-type scales are used to measure the magnitude of loyalty (potential loyalty), it is essential to examine how customers classify product categories according to the loyalty potential they feel towards brands in different categories. As the current-market environment is often characterized by strong competition, it is very important for companies to build a stable customer portfolio for each specific target segment. For retailers, loyalty programs make one of the most commonly used marketing tools. In order to make such loyalty programs effective, it is necessary to take into account many different parameters of the program, which may vary significantly across product categories.

Customer loyalty is closely related to brands. Brand attitudes are an important starting point in building a conceptual model of consumer-brand relationships. (Fullerton, 2005, p.100). Frequent terms used in connection with brand loyalty, encompassing trust and repurchase intention are “brand commitment”, ”brand trust”, or “brand community” (Hur, Ahn and Kim, 2011). Target groups can be described in terms of various suitable lifestyle factors, which may prove useful for marketing purposes. This way, companies can describe their typical customers in a broader context. Therefore, standard customer profile characteristics consisting of sociodemographic data (age, living place or education) can be augmented by “soft information” such as purchasing habits, work preferences, cultural background, free time activities and attitudes toward matters such as nature protection, etc. Chung and Hsu (2012, p.304) make a similar statement, by pointing out the advantages of quantified lifestyle factor information for tasks such as market strategy development or market segmentation.

The authors of this paper carried out consistent research (in terms of data gathering and subsequent analyses) in the Czech Republic, the Slovak Republic and in the Russian Federation. Our research aims to find out the degree of importance ascribed to brands in particular product categories by customers in the three countries. The respondents were asked to anonymously provide their socio-demographic data, lifestyle preferences, consumer behaviour information and attitudes towards finances and savings. For this purpose, the respondents were presented with almost thirty statements for which they were asked to indicate the intensity of agreement or disagreement with the statement considered. Statements such as “I do sports/fitness activities”, “I follow the news and keep myself informed about current events”, “I am active in my job, I am

assertive and ambitious", "I like to buy a nice thing, even if I have to take a loan" may serve as examples.

Our target is twofold: it consists not only in finding out the strength of the consumer bond to the brands in particular product category, but we also aim to find differences in the consumers´ characteristic features across product categories. Such analysis may significantly contribute to effective marketing communication and for improved targeting processes, i.e. finding suitable customer target groups and focusing money and efforts accordingly. In our paper, we use the surveyed primary data to answer two main questions:

Research question 1: In what product categories do customers attach importance to brands, and how much does the brand importance differ across product categories.

Research question 2: Which of the socio-demographic and lifestyle factors may significantly influence brand loyalty for different product categories, and what is the actual importance of each of these factors.

4 RESEARCH METHODOLOGY

For our analysis of consumers' brand loyalty across different product types, we use the following product categories: (a) Drugstore, (b) Master domestic appliances, (c) Small domestic appliances, (d) Electronics, (e) Hobby & garden, (f) Toys, (g) Household equipment, (h) Clothing, (i) Shoes, (j) Food & beverages, (k) Restaurants. This classification reflects common retail and marketing practice, as products are often categorized for the purpose of retail analysis, planning, audit, etc. Also, such product classification is supported in literature (see e.g. Oliver, 1999).

Our research was performed using primary survey data for three selected countries: the Czech Republic (CR), the Slovak Republic (SR) and the Russian Federation (RF). Given practical data-gathering limitations and RF's inherent cultural & economic diversity, only the Moscow Region and the Southern Federal Region were used for this research paper. A complex, stratified/quota sampling anonymized survey was performed during November 2015, gathering a sample consisting of 490 respondents from a population of retail consumers aged 15+. The stratified/quota sampling was based on gender, age segmentation and location of the respondents (the above mentioned limitations on domicile sampling apply to RF). The survey was focused on gathering respondents' socio-demographic data, answers to questions related to brand stance on different product categories, free-time and lifestyle preferences, self-positioning and attitudes toward various types of work and leisure activities. Different types of questions were used in the survey: quantitative (mostly interval-based), qualitative (Yes/No) and Likert scale (various degree spans are used). Both on-line and personal (paper-based) data collection methods were used. To avoid data handling errors, our questionnaires feature a fixed order of statements as three

language mutations, on-line & paper-based data sources are combined into one dataset for subsequent analysis. The survey was performed by researchers at the University of Economics, Prague. The research team was led by university employees and teachers who coordinate and supervise the work of students specializing on marketing research. This study is part of a long-term project of systematic scientific surveys and analyses of customer loyalty (see Tahal and Stříteský, 2014 or Formánek and Tahal, 2016).

Empirical data analysis is based on logistic regression models and related tests, as this approach allows to control for stratified/quota sampling (see James et all., 2013). Also, for survey data-validation, the Wald-Wolfowitz "Runs" test (see Wackerly, Mendenhall and Scheaffer, 2008) was used to test the H_0 of order of observations being attributable to chance against the H_1 of potential survey mishandling.

All data gathered from individual survey questions were processed into qualitative (binary) indicators for subsequent evaluation and modelling. The transformation of answers to Yes/No questions is trivial and for the quantitative (interval-based) variables, we use binary indicators describing the interval where the respondent falls in (e.g. the variable Age_15_24 equals 1 for all respondents aged 15 to 24 and is zero otherwise). Answers to the Likert scale-based questions have a qualitative nature and belong to a class of ordered multinomial data. For example: for the dependent variables of our model (1), we use Likert scale to record respondents' positions on brand importance in different product categories (value "1" = brand in the product category is very important to me; … ; value "4" = brand in the product category is totally unimportant to me). The fact that "1" is a better rating (brand importance perception is stronger) than "2" conveys useful information, but the rating has ordinal meaning only - we cannot say that the difference between "1" and "3" is twice as important as the difference between "3" and "4".

Generally speaking, Likert scale data allow for the application of ordered multinomial regression models. However, this rather complex approach (based on a concept of latent dependent variables) leads to estimated model coefficients that cannot be simply and unambiguously interpreted for the intermediate responses, i.e. for all responses but the best and worst Likert scale outcomes (for detailed discussion, see Wooldridge, 2010, p.665). Hence, considering both the nature of our survey data and our research focus, we record the Likert scale data as binary variables in a way that corresponds with our research focus and does not impair the interpretability of our results: For responders who attach considerable importance to brands in a particular product category (response "1" on the Likert scale), we record a "success" (our binary variable equals 1 for the *i*-th surveyed individual), while responses "2" to "4" on the Likert scale lead to zero-value observations of the binary variable (as the *i*-th surveyed individual attaches limited or no importance towards brands in a given product category).

In a rather similar manner, different lifestyle factor questions that respondents addressed using Likert scale choices were used to produce binary indicators –

potential regressors for our models. The transformation of lifestyle data for use in quantitative models may be briefly described using a second example. For a statement "I like watching TV", respondents were asked to position themselves on a five degree Likert scale ("1" = this statement describes me very well, "5" = this statement does not describe me at all). Please note that the subjectively perceived importance to one's lifestyle is addressed here, rather than the actual watching time. Answers to this particular question were used to produce two binary variables: LS_TV_yes equals 1 for those who reported "1" on the Likert scale and zero otherwise, LS_tv_no equals 1 for those who dissociated themselves from the statement by answering "5" (and it equals zero otherwise). Using this approach, we are able to select all the cases where respondents have strong positions on a specific activity or lifestyle: e.g. going to cinema, reading books, doing sports, being a vegetarian, eating fast-food, etc. To finalize the TV example, we should note that all the answers "2" to "4" (not a very strong position on the topic) are combined into one category and may still be implicitly included in the analysis by forming a base (reference "attitude", i.e. respondent's position), necessary for interpretation of coefficients in the estimated regression models. Also, using the answers "2" to "4" as a basis has the advantage of de-coupling the LS_TV_yes and LS_TV_no binaries: those are not linearly dependent (at least theoretically) and might be both used as regressors in the same regression equation.

Hence, we have transformed the survey material into a 490-row dataset containing 11 binary indicators describing whether respondents attribute high importance to brands in 11 different product categories. Also in the dataset, we have 68 potential explanatory variables, containing sociolo-demographic data, individual lifestyle preferences and other relevant information. In order to select a representative and consistent set of explanatory variables, we use a non-parametric random forest approach (see James et al., p.318-321) to evaluate the importance of explanatory variables. This computationally feasible approach (the random forest for each product category consisted of 5,000 trees in our case) produced a relevant set of regressors. This approach may be regarded as an acceptable approximation to the computationally implausible search for the optimum (best) model. In our case, the brute-force approach to model selection would require a total of 2^{68} possible regression model specifications to be estimated and evaluated for each of the 11 dependent variables (see James et al., 2013, p.205).

The information on regressor importance as gathered for all dependent variables was used to generate a consistent model specification encompassing a total of eleven socio-demographic and lifestyle (LS) explanatory variables:

$$y_i = \beta_0 + \beta_1 Female_i + \beta_2 Age\_15\_24_i + \beta_3 Age\_25\_34_i + \beta_4 Age\_35\_49_i + \beta_5 SVK_i + \beta_6 RUS_i + \beta_7 LS\_Paycard\_yes_i + \beta_8 LS\_tourist\_yes_i + \beta_9 LS\_greenfing\_yes_i + \beta_{10} LS\_TV\_yes_i + \beta_{11} Earnings\_low_i + u_i, \quad (1)$$

where y_i is a binary dependent variable describing whether the *i*-th respondent regards brands in a chosen product category as highly important to him/her and β_j are the regression parameters. $Female_i$ is a binary explanatory variable distinguishing between female and male respondents, $Age\_15\_24_i$, $Age\_25\_34_i$ and $Age\_35\_49_i$ are binary variables indicating the age category where the *i*-th respondent belongs to (for empirical reasons, age ranges 50-64 and 65+ were combined into a single reference category: age 50+). SVK_i and RUS_i variables describe the country of residence of respondents (the Czech Republic serves as the reference category). $LS\_Paycard\_yes_i$ indicates whether the *i*-th respondent identifies himself/herself with actively using pay cards (credit and debit). $LS\_tourist\_yes_i$ defines people fond of and actively participating in touristic activities. Respondents keen of gardening (growing fruits and vegetables, lawn mowing, etc.) are discerned using $LS\_greenfing\_yes_i$. $LS\_TV\_yes_i$ has been introduced above. $Earnings\_low_i$ marks the respondents belonging to the lowest-income category. Earnings-wise, respondents were divided into four groups based on household income – with consistency of categorization across the three countries in mind. $Earnings\_low_i$ = 1 for household income of up to 780 EUR (or equivalent in local currency) per month. Finally, u_i is the potentially heteroscedastic random element of regression. Using matrix notation, the logistic function used for estimation of the parameters β_j in (1) may be re-written as

$$P(y_i = 1 \mid \boldsymbol{x}_i^T) = G(\boldsymbol{x}_i^T \boldsymbol{\beta}) = exp(\boldsymbol{x}_i^T \boldsymbol{\beta})/[1 + exp(\boldsymbol{x}_i^T \boldsymbol{\beta})], \quad (2)$$

where $P(y_i = 1 \mid \boldsymbol{x}_i^T)$ is the probability of success, i.e. whether the *i*-th respondent regards brands in the selected product category as important, given the observed set of explanatory variables $\boldsymbol{x}_i^T$. $G(\boldsymbol{x}_i^T \boldsymbol{\beta})$ is a simplified notation for the logistic function $exp(\boldsymbol{x}_i^T \boldsymbol{\beta})/[1 + exp(\boldsymbol{x}_i^T \boldsymbol{\beta})]$. Under most practical circumstances, the maximum likelihood estimation method provides consistent and asymptotically normal estimates of the coefficients in logistic regression models (for detailed discussion, see Wooldridge 2010, p.568).

For any logistic model, the direction of the effect of change in the explanatory variable x_j on the probability of "success" in the dependent variable is always determined by the sign of the corresponding β_j coefficient. However, the magnitudes of the individual β_j coefficients are not particularly informative by themselves, given the nonlinear nature of the logistic function (2). The actual

effect of a change in x_j on the probability of "success" for the *i*-th respondent must be calculated individually: for example, let's use some binary explanatory variable, say x_k – then, the partial effect from changing x_k from 0 to 1 (while holding all other explanatory variables unchanged) may be simply calculated as

$$\Delta P(y_i = 1 \mid \boldsymbol{x}_i^T) = G\left(\beta_0 + \beta_1 x_{1,i} + \cdots + \beta_{k-1,i} x_{k-1,i} + \beta_k\right) - G\left(\beta_0 + \beta_1 x_{1,i} + \cdots + \beta_{k-1,i} x_{k-1,i}\right), \quad (3)$$

where the $G(.)$ functions come from (2). In expression (3), we may note that the β_k coefficient is present when $G(.)$ is evaluated for x_k = 1 and omitted for x_k = 0. Although the population-based β_j coefficients are not usually available, expression (3) may be evaluated using the sample estimates of β_j. As a logical next step, equation (3) may be used across all individuals in the sample, in order to conveniently summarize the estimated partial effects of changes in x_k (or any chosen regressor). The often used average partial effect (APE) approach is based on calculating the expected partial effects of changing a given binary regressor x_k from 0 to 1 (ceteris paribus) for each of the survey respondents and reporting the average value: $APE(x_k)$. Consistent estimates of $APE(x_k)$ for binary regressors may be obtained by evaluating the expression

$$APE(x_k) = N^{-1} \sum_{i=1}^{N} \left[G\left(\hat{\beta}_0 + \hat{\beta}_1 x_{1,i} + \cdots + \hat{\beta}_{k-1,i} x_{k-1,i} + \hat{\beta}_k\right) - G\left(\hat{\beta}_0 + \hat{\beta}_1 x_{1,i} + \cdots + \hat{\beta}_{k-1,i} x_{k-1,i}\right)\right], \quad (4)$$

where $\hat{\beta}_j$ are the estimated regression coefficients and expression (4) is evaluated for all the individual observations – i.e. for all *N* respondents. Using expression (4), APEs may be calculated for all binary regressors x_j in our model (1). The estimated APEs may be used for interpretation and can be compared across different models (i.e. for brand loyalty in different product categories). Although all regressors in model (1) are binary, the specification chosen provides enough control for diverse observed factors that it allows for a straightforward interpretation of individual APEs – a situation that is analogous to the Ignorability of treatment assumption (see Wooldridge, 2010, p. 908). Thus, logistic regression and related methods may provide quantified results, with easily accessible and often actionable information for diverse brand management and marketing tasks. Also, the above described methodology is an extension to the quantitative analysis framework used in our previous paper (Formánek and Tahal, 2016).

5 RESEARCH RESULTS

Brand perception is assessed using diverse data evaluation methods in order to quantify different aspects of brand loyalty and its consumer structure across product categories. First, the Wilcoxon signed rank tests for matched pairs (see Wackerly, Mendenhall and Scheaffer, 2008) is used to test for differences in relative frequencies of brand loyalty across product categories. For example, we may ask whether the reported percentage of brand importance (brand importance perception ratio) in the Electronics category is statistically different from other product categories. Based on our representative sample, we analyse consumer loyalty across all the selected 11 product groups. The results are summarized in Table 1, where product categories are ordered (descending order) by their perceived brand importance. The higher the product category ranks in Table 1, the more brands in a given category are associated with customer loyalty. Also, lower product category positions in the Table mean that brands have a less prominent capacity to attract customer loyalty. We test for statistically significant differences in observed means. Results of the Wilcoxon signed rank tests (matched pairs) - as performed on the 55 possible pair combinations of product groups - are visualized in the rightmost column of Table 1. The “matched pairs” version of the Wilcoxon signed rank test serves to control for specific variances in paired (correlated) observations.

The Electronics category stands out with a 45.3 % positive outcome, i.e. the percentage of respondents who perceive/express brands as very important in this category. Statistically speaking, this differentiates Electronics from all other categories, where brand importance is significantly lower. At the 5% significance level, we have identified five groups (with 2 or more elements per group) of product categories with equal brand propensity ratios (statistically speaking). For example, when the category Master domestic appliances (MDA) is pairwise compared to Shoes and to Food & beverages, their means are not statistically different. However, when comparing the mean of Food & beverages against Shoes, we find a nonzero difference at the 5% significance level. Therefore, the three product categories may not be combined into a single group. As shown in Table 1, two groups need to be created and the MDA category is involved in both. On the other hand, categories Restaurants, Drugstore, Household equipment and Toys form a single group as far as pairwise differences in means are concerned, as none of the mean values involved is statistically different from other group members.

Table 1 – Propensity to brand loyalty by product categories, Source: authors

Product category	Number of "successes" out of 490 respondents	Average (positive outcome ratio)	Variance	Group highlighted where H_0 of equal means not rejected.
Electronics	222	0.453	0.248	
Shoes	158	0.322	0.219	
Master domestic appliances	151	0.308	0.214	
Food & beverages	131	0.267	0.196	
Clothing	105	0.214	0.169	
Small domestic appliances	103	0.210	0.166	
Restaurants	77	0.157	0.133	
Drugstore	71	0.145	0.124	
Household equipment	67	0.137	0.118	
Toys	64	0.131	0.114	
Hobby & garden	52	0.106	0.095	

While interpreting the results in Table 1, we need to keep in mind the nature of the brand loyalty data: "success" is counted only if the respondent regards brands in a chosen product category as highly important. Technically, for the 4-degree Likert scale described in chapter 3, we only discriminate between value "1" ("Brand in the product category is very important to me") and all other outcomes combined. This approach leads to clear differentiation between customers with sound propensity towards brand loyalty in a given product category and those without such a distinctive marketing potential.

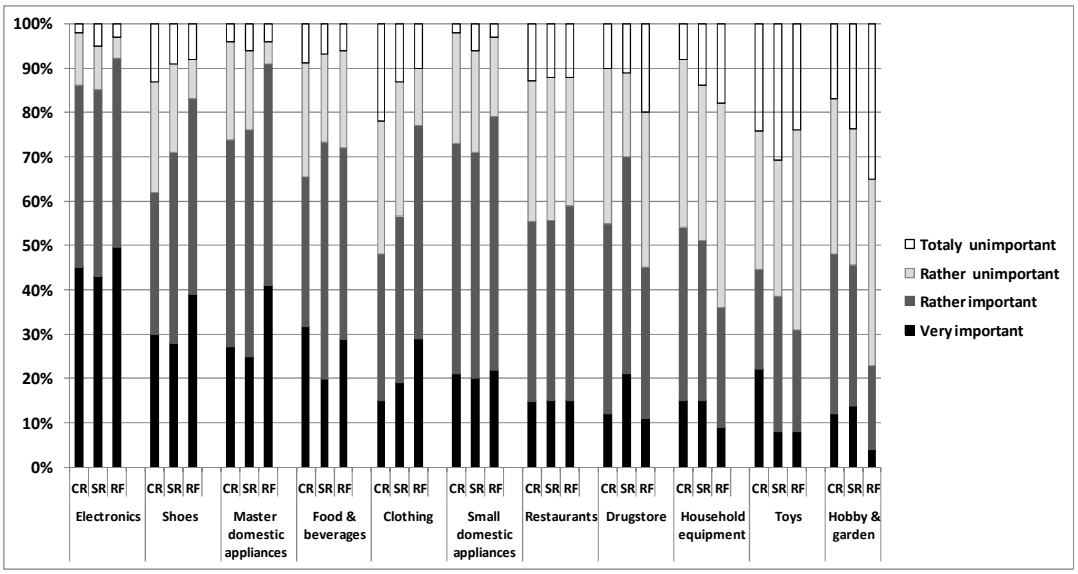

Figure 1 – The importance of product categories in the three countries, Source: Authors

Figure 1 aims to provide the readers with information on the detailed structure of the surveyed attitudes towards brand importance. In Figure 1, individual Likert-scale answers are summarized across different product categories and for each of the three countries included. Hence, for each product category, there are three columns in Figure 1, displaying the differences and/or similarities among the three countries covered – CZ, SR and RF.

Using the summarized information as per Table 1 and Figure 1, we may draw conclusions about the overall potential for brand loyalty. For example, our data show that brand importance ratio in Small domestic appliances is not statistically different from the Clothing category. However, this does not mean that identical overall positive outcome ratios are generated by identical respondent groups (again, statistically speaking). In theory, positive outcomes in the two groups considered (Small domestic appliances and Clothing) may as well come from two mutually exclusive groups. In practice, many random influences play a significant role at the individual level, yet by means of logistic regression, we are able to identify and quantify many statistically significant differences in brand perception among diverse socio-demographic groups of consumers. In addition, relevant survey-based factors and indicators (such as lifestyle preferences) may be used to discern brand-related differences among respondent groups.

Next, our analysis concentrates on answering the Research Question 2. All brand loyalty data are used as dependent variables in logistic regression models in order to quantify the importance (statistical significance and magnitude) of the effects of various socio-demographic and lifestyle factors on the attitudes of respondents towards brands in different product types. Given the choice of socio-demographic and lifestyle explanatory variables described in chapter 4, the regression model (1) was estimated for each of the 11 binary dependent variables

describing brand importance across product categories. All the estimated logistic models are statistically significant and provide reasonable prediction accuracy. As the individual regression coefficients of the logistic models are not particularly informative - except for their signs - we skip the regression output tables and focus on the APE values from equation (4), along with their interpretation. Actually, all signs and statistical significances of the $\beta_{c,j}$ regression coefficients may be traced to their corresponding $\mathrm{APE}_c(x_j)$ values, where the subscript *c* denotes the *c*-th product category used in equation (1). All estimation outputs omitted from this article are available from the authors upon request, along with supplementary plots, raw survey data and R-code used. In Tables 2 and 3, we report APE values calculated for each explanatory variable and every product category. The individual $APE_c(x_j)$ values are reported along with their standard errors (heteroscedasticity-robust values are used) and p-values. Columns in Tables 2 and 3 are organized by brand importance in the same way as rows in Table 1: the first six product categories (rows) from Table 1 are included in Table 2 and the remaining five product categories constitute Table 3. Therefore, the output allows for a simple comparison of APEs between regressors in adjacent columns, where product categories often belong to the same group in terms of the overall propensity towards brand loyalty.

For interpretation of the results shown in Tables 2 and 3, we shall use the example of Shoes and MDA categories. The information from Tables 1 to 3 may be combined as follows: Although Shoes and MDA categories do not differ in brand importance perception ratios, significant differences exist between respondent groups defined in equation (1). Brand importance perception is not determined by gender for Shoes, but women are approximately 7.9 % more likely to regard brands as important in the MDA category. For Shoes, people aged 15 to 24 are 20.7 % more likely to report brand importance as compared to those aged 50+ (our reference group) and we observe + 12.5 % in success probability for the age group 25-34 as compared to the reference group. In the Shoes category, age group 35-49 does not differ from the reference group in terms of reported brand importance. The age-dependence structure in Shoes may be compared to the MDA category, where people aged 25-34 and 35-49 may be associated with a 12.6 % and 15.7 % increases in reported brand importance, while the age group 15-24 is not statistically different from the reference. Nationality plays no role for brand perception in Shoes. For the MDA category, people from the RF are 11.7 % more likely to report brands as important than the reference (CR) and consumers from SR do not exhibit distinct brand perception from the reference. While people who report being active pay card users ($LS\_Paycard\_yes$) are 11.9 % more likely to report brand importance in MDA (as compared to those who report either indifferent or negative stance on the subject), this factor is not important for Shoes. Participation in touristic activities ($LS\_tourist\_yes$) leads to + 12.5 % in success probability for Shoes but it plays no role for the MDA category. In contrast, gardening ($LS\_greenfing\_yes$) may be associated with 15.7 % increase in brand propensity for the MDA category while it's not significant for Shoes. Respondent who strongly associate themselves with

watching TV (LS_TV_yes) are 13.4 % more likely to regard brands for Shoes as important (here, the reference group is formed by negative and neutral positions on the TV-watching subject). Low-income consumers ($Earnings\_low$) would result in – 13.3 % success probability in Shoes. For the MDA category, neither of the last two factors is significant.

In a similar way, Tables 2 and 3 may be used to identify differences and similarities in consumers' brand loyalty across any chosen product categories and/or product groups as identified in Table 1. In a stratified manner, product categories can be characterized by their potential to attract brand loyalty from consumers of different socio-demographic and lifestyle-based groups. As Tables 2 and 3 provide extensive material for comparison, readers are welcome to make own collations and conclusions. In the following paragraphs, we only focus on the most prominent, important and potentially actionable findings.

Table 2 – Estimated APEs for different product categories - columns 1-6 / 11, Source: authors

Product categories / Regressors	Electronics	Shoes	Master dom. app.	Food & beverages	Clothing	Small dom. app.
Female	**-0.0428**	**0.0280**	**0.0793**˙	**0.1252**	**-0.0282**	**0.0315**
(standard error)	(0.0455)	(0.0418)	(0.0420)	(0.0397)	(0.0375)	(0.0363)
[p-value]	[0.3470]	[0.5039]	[0.0589]	[0.0016]	[0.4523]	[0.3855]
Age_15_24	**0.1615***	**0.2068***	**0.0661**	**0.0379**	**0.1430***	**-0.0273**
	(0.0623)	(0.0641)	(0.0620)	(0.0618)	(0.0611)	(0.0528)
	[0.0096]	[0.0013]	[0.2865]	[0.5393]	[0.0191]	[0.6044]
Age_25_34	**0.1065**˙	**0.1249**˙	**0.1263**˙	**0.0113**	**-0.0295**	**0.1158**˙
	(0.0640)	(0.0646)	(0.0646)	(0.0596)	(0.0562)	(0.0597)
	[0.0961]	[0.0531]	[0.0505]	[0.8499]	[0.5994]	[0.0522]
Age_35_49	**0.1213***	**0.0625**	**0.1571***	**0.0655**	**-0.0141**	**0.1379***
	(0.0573)	(0.0574)	(0.0561)	(0.0533)	(0.0476)	(0.0526)
	[0.0344]	[0.2760]	[0.0051]	[0.2191]	[0.7664]	[0.0087]
SR (SVK)	**-0.0462**	**-0.0376**	**-0.0653**	**-0.1354**	**0.0642**	**-0.0242**
	(0.0549)	(0.0528)	(0.0513)	(0.0437)	(0.0541)	(0.0444)
	[0.4002]	[0.4757]	[0.2029]	[0.0020]	[0.2352]	[0.5864]
RF (RUS)	**0.0174**	**0.0373**	**0.1166***	**-0.0445**	**0.1438***	**0.0269**
	(0.0547)	(0.0518)	(0.0519)	(0.0467)	(0.0516)	(0.0451)
	[0.7508]	[0.4716]	[0.0246]	[0.3409]	[0.0053]	[0.5515]
LS_Paycard_yes	**0.0927***	**0.0599**	**0.1193***	**0.0149**	**0.0346**	**0.0490**
	(0.0454)	(0.0421)	(0.0410)	(0.0404)	(0.0368)	(0.0363)
	[0.0414]	[0.1556]	[0.0036]	[0.7127]	[0.3469]	[0.1764]
LS_tourist_yes	**0.0896***	**0.0754**˙	**0.0485**	**0.0455**	**0.0495**	**0.0831***
	(0.0448)	(0.0414)	(0.0406)	(0.0395)	(0.0358)	(0.0355)
	[0.0454]	[0.0688]	[0.2323]	[0.2488]	[0.1666]	[0.0193]
LS_greenfing	**0.0751**	**-0.0241**	**0.1573***	**0.0846**	**-0.0714**	**0.1145***
_yes	(0.0567)	(0.0547)	(0.0569)	(0.0547)	(0.0470)	(0.0538)
	[0.1851]	[0.6598]	[0.0058]	[0.1223]	[0.1290]	[0.0335]
LS_TV_yes	**-0.0299**	**0.1335***	**-0.0451**	**0.0801**	**0.1173***	**-0.0047**
	(0.0598)	(0.0614)	(0.0562)	(0.0586)	(0.0593)	(0.0509)
	[0.6170]	[0.0298]	[0.4226]	[0.1718]	[0.0479]	[0.9261]
Earnings_low	**-0.1117***	**-0.1326***	**-0.0466**	**-0.0741**	**-0.0790***	**-0.091***
	(0.0524)	(0.0457)	(0.0482)	(0.0449)	(0.0400)	(0.0394)
	[0.0328]	[0.0037]	[0.3341]	[0.0987]	[0.0480]	[0.0209]

Note: * - coefficient significant at $\alpha = 0.05$; ˙ - coefficient significant at $\alpha = 0.1$.

Table 3 – Estimated APEs for different product categories - columns 7-11 / 11, Source: authors

Product categories / Regressors	Restaurants	Drugstore	Household equipment	Toys	Hobby & garden
Female	**0.0393**	**0.0895***	**0.0086**	**0.0447**	**-0.0746***
(standard error)	(0.0326)	(0.0299)	(0.0316)	(0.0290)	(0.0281)
[p-value]	[0.2276]	[0.0028]	[0.7855]	[0.1228]	[0.0080]
Age_15_24	**0.0595**	**0.0341**	**0.0294**	**-0.1082***	**-0.0047**
	(0.0572)	(0.0529)	(0.0493)	(0.0313)	(0.0407)
	[0.2982]	[0.5188]	[0.5516]	[0.0005]	[0.9080]
Age_25_34	**-0.0063**	**0.0621**	**-0.0247**	**0.1330***	**-0.0443**
	(0.0517)	(0.0487)	(0.0423)	(0.0531)	(0.0327)
	[0.9028]	[0.2028]	[0.5586]	[0.0123]	[0.1756]
Age_35_49	**0.1363***	**0.0179**	**0.0433**	**0.0362**	**-0.0019**
	(0.0532)	(0.0418)	(0.0421)	(0.0389)	(0.0317)
	[0.0104]	[0.6685]	[0.3028]	[0.3516]	[0.9527]
SR (SVK)	**-0.0153**	**0.0632**	**-0.0186**	**-0.1383***	**-0.0223**
	(0.0401)	(0.0421)	(0.0368)	(0.0274)	(0.0289)
	[0.7017]	[0.1332]	[0.6125]	[0.0000]	[0.4408]
RF (RUS)	**-0.0157**	**-0.0216**	**-0.0388**	**-0.0830***	**-0.0530˙**
	(0.0403)	(0.0427)	(0.0370)	(0.0291)	(0.0299)
	[0.6966]	[0.6136]	[0.2946]	[0.0044]	[0.0766]
LS_Paycard_yes	**0.0386**	**0.0912***	**0.0301**	**0.0141**	**0.0580***
	(0.0326)	(0.0306)	(0.0308)	(0.0296)	(0.0288)
	[0.2364]	[0.0029]	[0.3283]	[0.6322]	[0.0438]
LS_tourist_yes	**-0.0043**	**0.0311**	**0.0380**	**-0.0019**	**-0.0141**
	(0.0321)	(0.0304)	(0.0300)	(0.0282)	(0.0255)
	[0.8933]	[0.3075]	[0.2056]	[0.9472]	[0.5805]
LS_greenfing	**0.0159**	**0.0598**	**0.0750˙**	**0.1193***	**0.2179***
_yes	(0.0470)	(0.0421)	(0.0452)	(0.0444)	(0.0502)
	[0.7349]	[0.1560]	[0.0966]	[0.0073]	[0.0000]
LS_TV_yes	**-0.0545**	**-0.0554**	**0.0190**	**-0.0084**	**-0.0165**
	(0.0428)	(0.0374)	(0.0430)	(0.0380)	(0.0325)
	[0.2022]	[0.1389]	[0.6581]	[0.8246]	[0.6109]
Earnings_low	**-0.0623˙**	**-0.0783***	**-0.0723˙**	**-0.0157**	**-0.0472˙**
	(0.0356)	(0.0318)	(0.0317)	(0.0328)	(0.0280)
	[0.0803]	[0.0139]	[0.0226]	[0.6331]	[0.0912]

Note: * - coefficient significant at $\alpha = 0.05$; ˙ - coefficient significant at $\alpha = 0.1$.

Gender plays no role in brand attitude for 7 of the 11 product categories, yet female respondents are more prone to brand loyalty in the MDA, Food & Beverages and Drugstore categories by a factor of 7.9 % to 12.5 %. In contrast, women are less likely to report brand importance in the Hobby & garden category: - 7.5 %. For illustration and readers' convenience, the ceteris paribus effects on brand loyalty (along with 90 % significance intervals) of the regressor *Female* are included in Figure 2. For example, the leftmost bar (within the *Female* group) shows that women are 4.3 % less likely to consider brands as important in the Electronics category. At the same time, the corresponding 90 %

significance interval includes zero and thus the effect is not statistically significant at $\alpha = 0.1$ (significance level of 10 %).

The most prominent age-based brand loyalty differences exist in Electronics, Shoes and MDA categories, while this factor plays no role in Food & beverages, Drugstore, Household equipment and Hobby & garden categories. Respondents' domicile plays a role in 5 of the 11 product categories. The most prominent geographically defined difference was observed for the Clothing category – consumers in RF express 14.4 % increase in potential for brand loyalty (compared to CR as a reference). Also, for the MDA category, RF is associated with + 11.7 % while brands in Toys and Hobby & garden categories are regarded as less important in RF: by - 8.3 % and - 5.3 % respectively. Generally speaking, brand perception is rather equal in CR and SR, with the exception of Food & beverages (- 13.5 % in SR) and Toys (- 13.8 % in SR).

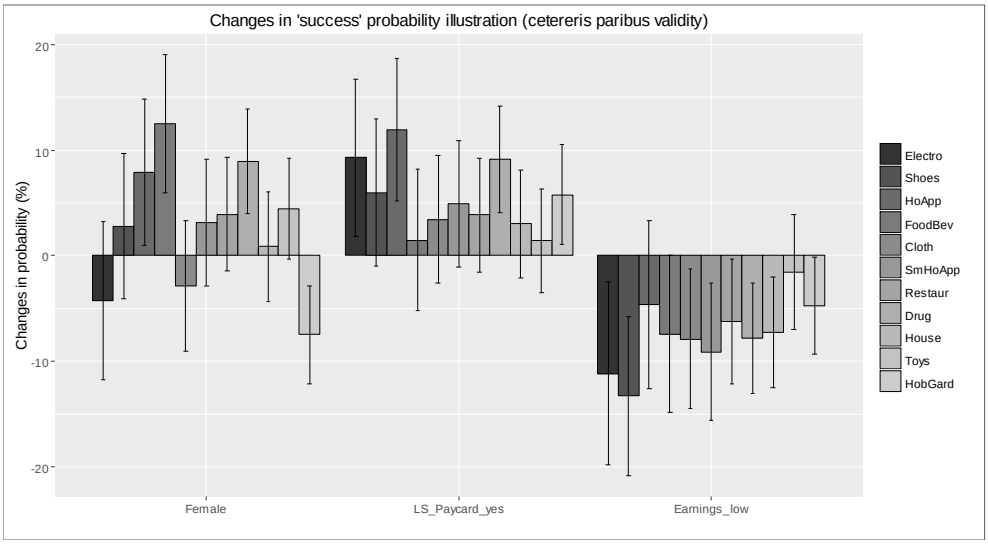

Figure 2 - Illustration of selected results from Tables 2 & 3
Source: authors

For the lifestyle variables, some interesting facts also may be pointed out. Respondents who associate themselves with some lifestyle or activity are more likely to attribute importance to brands in every product category considered – if statistically significant, the differences in success probabilities (compared to the reference) is always positive. The main difference between active pay card users ($LS\_Paycard\_yes$) and their reference group may be observed in the MDA category (+ 11.9 %), while this factor increases perceived brand importance in the Electronics and Drugstore categories by 9.2 % and 9.1 %. Variable $LS\_Paycard\_yes$ is also included in Figure 2. Product categories considered, active gardeners ($LS\_greenfing\_yes$) are 21.8 % more likely to attribute importance to brands in the Hobby & garden category (a rather intuitive result), while the differences in MDA and Small domestic appliances are + 15.7 % and + 11.5 % respectively.

Generally speaking, consumers with low earnings ($Earnings\_low$) regard brands as less important. This factor is most prominent in the Shoes (- 13.3 %) and Electronics (- 11.2 %) categories. For most of the remaining product categories, propensity to brand loyalty is decreased by around 7-8 % for the low-earnings consumers. Finally, earnings have no effect on brand importance perception in the MDA and Toys categories. Illustration of the effects of low earnings on brand importance perception is also provided in Figure 2.

6 CONCLUSIONS AND PRACTICAL IMPLICATIONS

In this contribution, we apply a wide range of quantitative analysis tools in order to examine brand loyalty across different product categories, taking into consideration attributes that characterize consumers according to their sociodemographic classification, purchasing behaviour, attitudes towards modern technologies, work preferences, free time activities, etc. The inclusion of data gathered in three selected countries: the Czech Republic, the Slovak Republic and the Russian Federation may be viewed as a significant added value of this study as compared to previous analyses. Our study focuses on two main research topics: First, based on a statistical analysis, FMCG product categories are ranked by their power to attract customers´ interest for brands in each of the categories. Second, based on the logistic regression and related analyses (average partial effects), variables representing socio-demographic and lifestyle factors that most distinctly characterize the consumer groups exhibiting significant positive or negative propensity towards brand loyalty are highlighted and interpreted.

Considering the results shown in previous studies and the results shown here, we are convinced about the usefulness of applied quantitative research in the field of customer loyalty as an integral part of marketing science. For example, when building up effective loyalty programs, it is important to discern brands where loyalty is predetermined by the very product category from product categories where the brand choice is unstable and where focused marketing activities are desirable.

This paper also emphasizes the fact that brand loyalty is a highly complex phenomenon and that it can and should be analysed from different points of view. Our research can help marketers to find out whether their brands belong to a product category with an inherent tendency to give rise to positive emotions and to attract customers, or whether spontaneous bonds in the category are weak and it is therefore meaningful to support customer loyalty by investing time and money into suitable loyalty programs. Our research also shows that the segmentation based on sociodemographic and life-style factors would be very useful for customization of loyalty programs – we find significant differences in brand attitudes between specific customer groups across product categories.

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Personality Attitudes Affecting Employee Learning and Development: Prerequisites of Behaviour Leading to Learning and Development

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ABSTRACT

Purpose: This study aims to reveal current approach and reactions of employees towards learning and development in organisations and to specify variants of behaviour as factors affecting employee development.

Methodology/Approach: The paper is based on evaluation of quantitative research. The sample contains 211 employees from organisations across sectors. Bivariate and multivariate statistical methods and analyses were used to lower the number of possible single approaches and practices.

Findings: Results identified and verified variants of employee reactions on organisational learning and development process and its impact on performance using quantitative data. Researched areas of employee behaviour variability are motivation, affect and performance. Outcomes show the main ways which are used by employees in order to pass the learning and development process.

Research Limitation/implication: The results may be used in practice to manage employee behaviour in order to grow constantly and use their potential talents and leaders. Besides this study there are several promising avenues for further research, i.e. the impact of within-person motivation on life-long development and the longer term impacts of learning in organisations.

Originality/Value of paper: This paper identyfies and describes variability of emoployee within-person behaviour during learning and development process. Employees react in five different directions (positive, negative or neutral as resignation). The impact on organisation is either positive or none.

Category: Case study

Keywords: education; development; performance; motivation; affect

1 INTRODUCTION

Employee's behaviour during learning and development is a theme which is rarely studied. Every manager knows employee's behaviour varies over time, but this within-person variability is not well described, understood and sometimes is treated as error (Dalal, Bhave and Fiset, 2014). Therefore this study is focused on identification of a within-person approach to employee learning and development in organisations. The current extant theories of within-person variability converge on the contention that the process of organizational learning and development is dynamic rather than static. Day, Sin and Chen (2004) state that a considerable proportion of the variability in job behaviour is affected by within person rather than between-person sources. Although the benefits of understanding within-person variability in job behaviour are wide, there is a lack of clear knowledge about the systems and rules of types of employee behaviour. This paper defines various forms of variability and the various types of job behaviour during education and development in organisation.

The whole construct of within-person variability is very complex. Thus investigations in this area are useful because theorizing at the within-person level will provide a more scientific understanding of the process of variability of behaviour during employee education and development. On the other hand, it is important to note that within-person theorizing is usually frequently used in theory but empirical results are rare and do not differ because of their narrow focus (Dalal, Bhave and Fiset, 2014; Curran, Bauer, 2011; Beckmann, Wood and Minbashian, 2010).

Employee learning and development are truly crucial for organisational and economy development. But the process of learning and development is not constant. Variability of employee behaviour during organisational education and development is currently discussed theme; however there is a lack of studies and researches focused on this area. The aim is to reveal current approach and reactions of employees towards learning and development in organisations and to specify variants of behaviour as factors affecting employee development.

1.1 Theoretical Background

Current main goal of all organisations is to keep and develop quality employees (Ahsan, et al., 2013). It is obvious that the only thing that remains truly crucial in order to upgrade the organisations' and economy level are people and their management. Human resources and the ability of organisations of their management and development is irreplaceable in current knowledge economy (McDonnell, Lavelle and Gunnigle, 2014; Gururajan and Fink, 2010; Manning, 2010). Therefore, organisations should focus on education and learning process of each employee. It is necessary to monitor the process and reactions of employees on education and development with regard to their personality, kind of work, social values and behaviour – each employee is an individual with different perception and reactions (Loke, et al., 2012). Employees who are being

educated and developed usually higher their interest in further development, they get to know the learning process and use of their abilities; they also learn how to manage and use their reactions to learning and development and how to continue in learning the process on a higher level. They also find how to use their new skills and knowledge to upgrade their performance. Employees who are constantly educated also work towards organisational goals and follow organisational strategy; they are communicative, cooperative, proactive, respectful, customer-friendly, willing and able to constantly learn (Li, et al., 2009; Vnoučková, 2013). As Gururajan and Fink (2010) have stated, measuring the level of education and the process evaluation in organisations is necessary for predicting future development.

As stated by, among others, Ghiselli and Haire (1960), Dalal, Bhave and Fiset (2014) the validity of measuring both performance and prerequisites and motivation of employees is not constant, but varies cyclically with the classic course of the recurring rise and fall. Most researchers agree on the fact that the variability of behaviour and, consequently, performance or motivation is affected by interpersonal circumstances rather than by interpersonal relationships (Day, Sin and Chen, 2004; Glomb, et al. 2011).

In addition, authors Vancouver (2012), Vancouver, Thompson and Williams (2001) have found out in research that under various conditions the results of a single personality are different - may be positive, negative, or not anyhow affected. Research and meta-analysis of authors Sitzmann and Yeo (2013) has further concluded that the results and applicability of learning (output and efficiency) do not depend on the prerequisites for development, age (Young, et al., 2008) or satisfaction (Fisher, 2003; Judge, et al., 2001) (correlation 0.01), but rather on the relationship between prerequisites and past performances, by which an individual has already manifested prerequisites (correlation 0.32). Similarly, the correlation with the objectives is positive (Bandura, 1997; Judge, et al., 2001).

Changes in behaviour in terms of learning, development and application of their results in practice can be divided into short-term fluctuations with peaks and subsequent declines (cyclic partial changes without fundamentally measurable impacts), in the matter of days (Kanner, et al., 1981), and long-term changes, which are required for the development (Lord, et al., 2010), in the matter of years or more. What is desirable, therefore, is a change observable in the long run, which is experiencing an upward trend or standard-growing or stable level.

In theory, we can divide prerequisites and variability of behaviour into three main clusters: (1) theories emphasizing the role of ability, skills and knowledge, (2) theories focused on both the ability and motivation and (3) theories focusing only on motivation. These theories are based on the assumption that the outcome is a function of ability and motivation, whereby the ability is the possibility of performance and motivation is the willingness to generate performance (Blumberg and Pringle, 1982; Campbell, 1990).

Individual theories provide insight from different perspectives. The result is, however, consistent with the rest of the presented theory, i.e., relations in the workplace and working environment, from which in its interaction conflicts arise are a key prerequisite for development. The change in learning and development is possible and measurable in a long-term horizon, when in a short time scale fluctuations occur that affect current approaches and effects. According to the prevailing impulses and trends in sinusoidal curve we can determine development or decline.

The submitted article is dedicated to the variability during learning and development of employees. Given the prerequisites set out in the theory it focuses predominantly on motivation, affect, and performance. These areas will be analysed using multivariate statistical methods for grouping of individual reactions of respondents to stimuli in education and development with the goal to describe the variability of their actions.

2 METHODOLOGY

The data were mainly extracted from secondary sources and analysis and discussion presented in the paper is linked to outcome synthesis and the evaluation of international research results. In order to capture all relevant studies, a variety of keywords for talent management, education, learning, attitudes towards learning process, motivation, performance and similar other ones were used. The research is descriptive and empirical in nature because the primary data were collected using the survey method through fact finding techniques such as questionnaire and interview.

The second part of this article analyses and evaluates the results of primary survey. The data for the evaluation of current education and learning in Czech organisations has been collected in primary quantitative survey by means of questionnaire investigation. Only one respondent per organisation was contacted. On behalf of the organisation, the questionnaire was completed by a respondent who holds a managerial position (has at least one direct subordinate). The data collection has respected the ethical aspects of research (Act No. 101/2000 Coll., on Personal Data Protection).

Questionnaires were completed by 211 employees in organisations across sectors. The method used for the collection of data was an electronic questionnaire that automatically recorded and pre-categorised respondents' answers (CAWI method) and telephonic interviewing (CATI method). The selection of a representative sample across sectors was carried out by selection of e-mail addresses and telephone numbers, which incorporates the advantages of multilevel random selection. The sample was selected solely for the purposes of the survey. The respondents were mainly (51%) from small organisations (till 50 employees), 24% were from medium sized organisations and 25% from large organisations (over 250 employees).

The questionnaires focused on the areas of organisational support (tangible and intangible rewards, mentoring, coaching, time to learn, constructive feedback), of education and learning, perception of support by employees, employee attitude toward education and learning, targets of education and learning and outcomes – innovations, promotions, organisational growth and reactions of employees on education and learning The conclusiveness of the outputs and relationships obtained were supported by the tools of descriptive statistics; the analysis of correlation and multidimensional statistical methods were used to review the outcomes.

The data collection instrument included questions to measure the activities of employee learning and development in organisation. The questions were designed based on theories and similar researches driven by Gannon and Maher (2012), Dalal, Bhave and Fiset (2014), Day, Sin and Chen (2004), Glomb, et al. (2011), Vancouver (2012), Vancouver, Thompson and Williams (2001) and Sitzmann and Yeo (2013). Respondents' reactions to target statements and their attitudes to the given matter were restricted by offering a set of several statements. The questionnaire was also designed to contain items to measure social integration mechanisms. Additionally, Likert type scale was used. The extremes of the seven-point scale represented bipolar concepts of the evaluation dimension with verbal anchors in 1 (strongly disagree) and 7 (strongly agree). The scale permitted not only the specification of respondents' attitudes, but also their intensity. Answers of respondents were categorized according to identification questions that formed the first part of the questionnaire.

The level of dependence was measured based on correlation coefficient, using a scale devised by De Vaus (2002) and Field (2009). Validity of construct and its parts were tested by Cronbach Alpha. Further analyses were based on multidimensional statistical methods – factor analysis (varimax rotation; the Kaiser-Guttman rule was applied to select a group of significant factors. Following the recommendations of Anderson (2009), only determinants with an absolute value exceeding 0.3 were selected as significant for factor development; positive and negative dependency was further analysed in relation to its final benefits). Analyses formed valid factors, which influence and determine employee behaviour during organisational development.

3 RESULTS

The objective of this chapter is to evaluate the results obtained in the primary survey. The results of the quantitative research have been statistically evaluated and outputs have been formulated.

As stated in the theory, prerequisites and motivation of employees to learn and grow are not constant, but vary cyclically with the classic course of recurrent rise and fall. Variability in behaviour or motivation for behaviour (learning and development) is influenced by interpersonal circumstances. A prerequisite that is

tested in the following subsections, i.e. that under various conditions the results of individual personalities are different, ensues from this.

Given the prerequisites defined in theory three main areas are tested: (1) The motivation for learning and development (2) affective perception and action, and (3) the performance provided. It is, therefore, an exploration of motivation (cause), affect (reaction), and performance (output) of education and development. These prerequisites should show the differences between the different approaches and variability in the behaviour of individuals within the education and development process.

3.1 Motivation

In the field of motivation approaches of employee to learning and development were tested. The areas that make them focus and that motivate them to learning and development were examined. Factor analysis was chosen to conduct the analysis. Similar styles of behaviour were sought during the monitored areas of education and development, describing stimulus and subsequent response that depends on the preferences of an individual, his inner values, goals and personal preferences. On the basis of these elements motivation of the groups of individuals and their responses to the set stimuli have been described. Identified factors helps to establish appropriate incentive mechanisms in the organization for encouraging sub-groups of employees to learning and development.

The analysis revealed four major categories of employee attitudes to learning and development, which explains 55% of the total sample. Analysis grouped variables into factors in the composition shown in Table 1 below. Significant dependencies are marked in bold.

Table 1 – Factors found in the field of motivation

	Factor			
	1	**2**	**3**	**4**
Focus on future development	.015	.085	**.702**	.012
Motivation to achieve something	-.019	.138	**.623**	**.562**
Work in the area of interest	**.694**	-.001	-.019	**.327**
Comparison with the performance of others	**.491**	-.015	**.470**	.038
Focus of results on performance	**.685**	.063	.112	-.129
Development/learning is part of the job	**.571**	.283	-.421	.190
Rewards for education (tangible)	.089	**.891**	-.019	.127
Incitement (intangible rewards)	.192	**.866**	.176	-.093
Education benefits for themselves	.099	-.008	.042	**.873**
Profit of education for organization	**.569**	.346	-.003	.001
% variance	16.69	15.02	11.73	11.45
Name of factor	Orientation on organizational development	Orientation on rewards	Orientation on future	Orientation on own development

Source: Author's processing

The first of the found factors explaining more than 15% of behaviour of the monitored employees. Incentives to encourage this kind of behaviour can be described as the orientation of employees on the development of the organization. According to the analysis results, they are very committed to the organization and have adopted its goals as if they were their own. They work in their own interest, they enjoy the work and are motivated to constantly develop and improve in the work process; their own progress is also a progress of an organization, which brings them satisfaction and motivates them to further achievements. In addition, they compare their performance with other individuals in the organization; they compare their benefits and compete among themselves which one of them will deliver greater benefits. Their learning and development, including further work activities are focused on performance. Through the growth of these employees the organization is growing accordingly. The organization is aware of this fact because in these cases learning and development is really a part of the job. Thus, the organization supports employees. At the same time, the monitored employees themselves stated that they develop because of the benefits for the organization. Both the organization and employee benefits from learning and development. This factor is very favourable for the organization; it concerns in the best sense of a word the Learning organization, having the right employees. The fact that the total of 16.69% of the monitored employees behaves like this is very positive.

The second factor found can be called Orientation on rewards; either tangible (salary / wages, benefits and other material benefits) or intangible (compliments, acknowledgement, recognition, advancement, promotions, etc.). This constitutes the main motivation of 15.02% of the monitored employees to develop. They will most likely not learn and develop without rewards; intrinsic motivation is low as regards these employees. They showed no interest in education, self-development, or development of organization. They are not interested in future orientation; they showed no relationship to work, colleagues, or performance.

The third factor explaining the behaviour of 12% of the reference sample of employees is focused and motivated with focus on the future, in which the employees see the positives of their current endeavour. However, they are strongly motivated to achieve something; it is not necessary to stimulate them from the outside. It is necessary, however, to show them an attractive future and the potential development that exists here. These employees are also motivated by the possibility of being compared with others, which drives them towards a set goal. Working with these employees is relatively easy if attractive goals are set for them (with them). The employees themselves want to fulfil them alone, without any further significant support of the organization.

The fourth factor shows the behaviour of employees depends on their motivation which is represented by the focus on learning and development, but only for themselves, not necessarily in relation to the organization. The factor can be called Orientation on own development. However, in the motivation to develop

and be educated the organization plays a role, because these employees are indeed motivated to achieve something by themselves, but they also must (want) to work in their area of interest, i.e. if the field of activity is suitable, these employees (11.5% of the monitored sample) are motivated to learn and develop, which has a positive impact on the organization. Moreover, the organization yet again does not have to make big efforts to motivate these employees, because they motivate themselves; they take learning and development as developing themselves and it motivates them to continue. It is, therefore, about talents or knowledge workers.

3.2 Affect

In the field of affective behaviour different perceptions and emotions were tested that were generated by employees during learning and development. Based on interviews employees were expressing their emotions and feelings, which their learning and development induces in them. These were then compared to the output values of education and development. The influence of effect on the output of the education and development process was monitored. Those areas were monitored that triggered a given behaviour (affect). For this analysis factor analysis was chosen again.

The analysis revealed five significant factors that characterize the affective behaviour of employees in learning and development. Factors explain the total of 61% of a sample. The analysis grouped variables into factors in the composition shown in Table 2 below. Significant dependencies are marked in bold.

Table 2 – Factors found in the field of affect

	Factor				
	1	**2**	**3**	**4**	**5**
Job orientation	-.035	-.151	**.778**	-.159	.024
Type of income	-.098	**.343**	**.638**	.096	-.230
Promotion	.287	-.282	**.527**	.269	.162
Entertaining	.007	**.625**	.060	**.480**	.258
Challenging	**.763**	.080	-.068	.188	.257
Motivating	-.045	-.338	.251	**.474**	**-.473**
Exhaustive	**.827**	.137	.019	-.057	-.218
Dull	-.004	.029	-.027	.044	**.853**
Stimulating	.220	**.808**	-.052	-.091	-.016
% variance	12.94	12.78	12.51	11.83	11.07
Name of factor	Challenging process	Stimulating process	Career development	Entertainment	Boredom and resistance
Affectation	Surrender	Joy	Expectations	Entertainment	Resistance

Source: Author's processing

As can be seen from Table 2, response to learning and development is very different among groups of employees. With each group the upcoming learning causes different affective response. The analysis revealed five basic responses to

learning and development. In the last row of the table a major affective response of the group is given.

In the first case, the learning and development is perceived as a difficult process that is also exhausting. This type of employees perceives education and development as an extra activity (compared to the usual working process), which makes them respond in terms of effect of defines against challenging activities. These employees do not directly resist learning and development; however, they consider them to be challenging. This kind of perception and affective response is typical for 13% of the monitored employees. Surrendering is a predominant affective response to learning and development.

The second factor grouped the monitored employees, for whom learning and development is stimulating, entertaining and, moreover, thanks to which they see the opportunity to distinguish themselves from others and get reward in addition to the form of a variable component depending on their changed abilities, or as a reward for the newly acquired skills or knowledge. These employees welcome learning and development, consider advantages of learning and development. They see learning as new activities, which will break them away from the stereotype and help them to move somewhere new. Total 13% of the reference sample behaves this way. Joy is the predominant affective response to learning and development.

The third factor characterizes employees who see positives in development in the possibility of obtaining an attractive position, career advancement, and better or variable income, depending on their activity and performance. They welcome learning and development as the possibility to improve their own abilities, they expect a positive future, to which they are looking forward. They accept learning and development pragmatically as a self-process and career development. This is how 12.5% of the reference sample sees development. Expectation is the predominant affective response to learning and development.

The fourth factor revealed a group of employees for whom learning and development is really motivating, they perceive it as fun. Expectations are really positive; these employees take educational and development activities as diversification, positive momentum and opportunity for active involvement. They never refuse opportunities offered for learning and development and use them to revive their workforce. 12% of employees behave in this manner. Entertainment is the predominant affective response to learning and development.

The fifth and last important factor found the opposite of the previous group. These employees show resentment to learning and development. They are bored by these activities; they do not want to be educated. They see no sense in education and development, nor aspire to higher positions or career development. They must be forced to education; they will not attempt to get involved in these activities. On the contrary, they argue that education and development demotivates them to work on the current job position in the organization. In this

way, learning and development influences effect of 11% of the monitored employees. Resistance is the predominant affective reaction to learning and development.

It is appropriate to count with these attitudes and reactions of employees to more appropriately set a process of learning and development and appropriate approach to the group.

3.3 Performance

The performance was tested as an outcome of the process of learning, education and development. Testing was carried out on the basis of outputs from interviews of employees who should have expressed what the result of learning and development is. The analysis monitors impact of the educational process on the output of an individual. For the analysis, as in previous cases, the factor analysis was used.

The analysis has revealed four significant factors that characterize the output behaviour of employees from learning, education and development. Factors explain 60% of the sample. The analysis grouped variables into factors in the composition, which is shown in Table 3. Again, the significant dependence is in bold.

Table 3 – Factors found in the field of affect

	Factor			
	1	**2**	**3**	**4**
Job position	.025	-.235	.056	**.665**
Type of income	-.004	.205	-.150	**.695**
Promotion	-.214	-.150	.010	**.530**
Excelling in tasks	-.066	.052	**.754**	**-.322**
Comparison with the performance of others	.173	.051	**.709**	.101
Competition and awards for performance	**.548**	.142	**.484**	.214
Focus on performance results	.068	**.812**	.238	-.084
Work on own projects	**.453**	**.485**	.086	-.176
Feedback in the organization	**.769**	.126	-.027	.021
Rewarding learning (tangible)	**.832**	.077	.128	-.112
Motivation (intangible rewards)	**.804**	.174	.182	-.136
Benefit for the organization	.235	**.786**	-.045	-.013
% variance	22.77	15.14	11.32	11.16
Name of a factor	Work in organization	Performance in the project	Focus on performance	Focus on position

Source: Author's processing

As seen from the analysis, four different types of behaviour are the output of learning process. Learning and development are used either to improve employee outcomes in the job performance, or to enhance the performance in the projects;

the third option is use of learning and development directly for improvement of the performance or focus on work in the desired position (promotion).

The first factor can be described as the output of learning and development in the form of application during the working process in the organization. This group of employees uses learning outcomes in competitions that appreciate their extra performance; they can, therefore, declare the gained new knowledge, skills or abilities. They work and utilize the results of education while working on projects; regarding the process and outcomes discussions are made, employees receive feedback and process and output are monitored and inspected. This is an appropriate approach of organizations that have an overview of how the process of learning and development works and what its outcomes are, where and how they are applicable. In connection with this the organization rewards the monitored process by both tangible and intangible rewards. It is, therefore, an educational and development process that is controlled mainly by the organization. It also emphasizes checking the results of the process and oversees that the outputs are incorporated into the work process. In this way, learning and development influence the final effect, i.e. the application of the results in 23% of the monitored employees.

The second factor brings together employees who focus on the application of learning and development results in the work on specific projects. The performance is, therefore, reflected in the project. The employees monitor during the process outputs in the form of benefits for their further specific activity. They are focused directly on performance; they are aware of the results that education brings and how they can be applied. At the same time, they argue that the benefit is especially obvious for the organization. They are educated in accordance with the objectives of the currently solved projects that need to be processed in the organization. It is a positive result of analysis for the organization that the employees in education and development focus on the performance and application of results in an organization. In this way, 15% of the monitored employees approach the results of learning and development.

The third factor puts together employees who are directly focused on performance, on their own output, which they want to compare with the performance of others; they love to compete and are rewarded for high performance. They use the outputs of the process of education and development to the maximum extent and want to excel. The monitored employees grouped in the given factor declare the ability to excel in tasks in relation to the learning and development. The process, therefore, has clear outcomes that employees use both in their own benefit and the benefit of the organization. Employees associated in this factor have an interest in education and development and use the results and declare the benefits of the process and its development. 11.3% of the monitored employees show these signs.

The fourth factor associates the employees who use the completed learning to obtain more positions, career development opportunities, and increase in

remuneration. The output of the analysis, which states that these employees excel in tasks, leads to this assertion. They use learning and development only for their own benefit and for career advancement or obtaining the required (probably promised) position. These employees, therefore, use primarily learning and development programmes to declare they have passed rather than for the actual application of the performance results. The organization in this case probably educates employees in the desired positions, but the output process of learning and development is probably not controlled. Following the learning the given employees are automatically expected to have acquired new knowledge, abilities and skills and the output is not checked. While the organization supports the learning process, the results are merely formal, without any link to performance. 11% of the monitored employees show these signs.

4 DISCUSSION

Employees who participated at the research are willing to learn and are interested in such an opportunity. From the study of Lord, et al. (2010) it can also be concluded that employees generally appreciate the opportunities for development, education and learning and consider them an essential part of their work. This is good news for organizations because motivation of employees is generally high and it is, therefore, easier to work on education and learning of such personnel. Most authors also agree that motivation rather than interpersonal relationships influence interpersonal circumstances (Day, Sin and Chen, 2004; Glomb, et al. 2011). Almost the same results were achieved in relation to tangible rewards (rewards and benefits), as stated in the results of this article. Kumaraswamy, Chitale (2012) and Fiol and Lyles (1985) add that for the efficiency of the process the whole process needs to be intertwined in an organization.

Employee behaviour leading to performance is important to achieve the organization's goals (Campbell, 1990). Employee behaviour variability changes in the rank-ordering of employee performance scores over time. Therefore validities of predictor variables are welcome. This study now understood that these conceptualizations are the defining characteristics of within-person variability. It is therefore possible to define within-person variability simply as the change in an employee's performance level over time (see also Dalal, Bhave and Fiset, 2014).

Similar research by Dalal, Bhave and Fiset (2014) suggests the existence of considerable within-person variability. In a preliminary analysis of 36 independent samples from experience sampling studies in the workplace or classroom (total number of respondents = 4,785) authors found that on average, 62% of the variability in task performance was connected to within-person sources. Metaanalysis made by Dalal and Hulin (2008) found considerable within-person variability in organizational citizenship behaviour (43%),

counterproductive work behaviour (49%), proactive behaviour (39%), creative behaviour (50%), and overall job performance (64%).

Most of the theoretical and scientific papers of organizational research neglected perspective of within-person performance variability or dismissed it as measurement error. Usually between-person worldview was studied. That made research questions simpler, and therefore so were theories, research designs, and statistical analyses (Dalal, Bhave and Fiset, 2014). By oversimplifying of the phenomenon of job behaviour variability the science was oversimplified as well. Thus the recommendations provided to practitioners were also oversimplified and useless. The goal of this study is to show some evidences that within-person variability plays an important role in this important, yet understudied, phenomenon. Yet, in the Czech or Slovak Republics, no similar researches were found.

The prospects of employees and organizations is seen in the work with social capital and understanding, developing and supporting relationships with others, as it can advance career and competitive success (Singh, et al., 2009). The paper examined the attitudes of employees and learning processes, education and development within the organization, i.e. how employees perceive support in area of learning and development in organizations, in which they are employed. The presented results and recommendations in response to identified weaknesses of other researches mentioned in the theory and discussion can be used in an organization of adult education, i.e. the employees' learning and development.

5 CONCLUSION

The results of research and analysis statistically reliably confirmed that the presented principles of employee learning and development are valid and important for development, education and management of talented employees. Resultant factors also clarify and support future aspirations of employees and organizational development.

The learning process most frequently goes through impulse in the form of employee orientation to the organization and its goals, or the rewards they obtain if they participate in learning and development. A reaction follows, which passes through the entire spectrum from joy to resistance. The application of increased performance while working on the job position or while working on projects then constitutes the result. Despite resistance from some employees the controlled process of learning and development that is embedded in the organization has the highest effect because all employees regardless of affects (reaction), through which they go, experience shift in learning and application of outputs. The efficiency of the learning process is then reached and it forces all employees to join in the process and to have clear and visible results.

The theory can be enriched by five affective reactions to learning and development. Employees on one hand welcome learning and development

activities (entertainment), have positive emotions from it and perceive it as a new stimulus (joy), or use it for their future advancement (expectations); in other cases, education is perceived as a duty and necessity that interferes into daily activities and requires concentration (surrender), or learning and development even induces with employees' dislike, boredom and lack of motivation (resistance). It is appropriate to count with these attitudes and reactions of employees to set more appropriate process of learning and development and appropriate access to the group.

Four types of identifiers of learning behaviour were found to correct the practice of education. Learning and development are used either to improve labour outcomes in a particular job, or to enhance the performance within projects; the third option is to focus learning and development directly on the performance or focus on work in the desired position (promotion). As regards half of the observed sample of employees the education and development is also reflected in the results, i.e. in terms of increasing performance and its application. As to 23% it is a process controlled by the organization, in other cases it is the self-interest of employees and their efforts to improve their performance. On the contrary, as to 11% of employees it is a purely formal process without any link to performance. Learning in organization is based on the reaction of employees when it comes to relationship to the external environment in the organization.

The results of the presented study may be recognized in other related researches focusing on within-person motivation and in an organization of adult education. Follow-up studies should determine the impact on lifelong learning and explore the long-term impact on learning within organizations. Additionally, presented results can be used in organisations to manage employee behaviour in learning and development process in order to positively influence the employee performance and consequently the performance of the whole organisation. Results also may be used in education process in higher education as case study in the area of human resource management.

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Adequacy, Suitability, Effectiveness and Efficiency of Quality Management Systems: How to Perceive and Assess them?

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ABSTRACT

Purpose: The paper brings set of original information related to the ISO 9001:2015 standard´s requirements focused on assessment and review of quality management systems adequacy, suitability and effectiveness.

Methodology/Approach: Brainstorming, field research, seminars, comparative literature analysis, interviews and design review were used.

Findings: According to the ISO 9001:2015 the quality management systems adequacy, suitability and effectiveness must be assessed and reviewed, in spite of the terms adequacy and suitability are not defined at the ISO 9000:2015 standard at all. Also literature review has discovered serious absentation in this area of interest. Additionally: the most of organizations managers (including quality professionals) do not understand these features of the modern quality management systems.

Research Limitation/implication: Special research activities focused on perception and practical using the quality management systems adequacy, suitability and effectiveness assessment and review was performed on sample of 172 Czech organizations (with 30 % response rate). A hypotheses described by Fig. 1 below cannot be confirmed as relevant data are unobtainable from Czech organizations at present.

Originality/Value of paper: The paper brings original set of information, regarding to definitions of terms as well as development of the quality management systems adequacy, suitability and effectiveness assessment and review at different types of organizations.

Category: Research paper.

Keywords: quality management systems; adequacy; suitability; effectiveness; efficiency.

1 INTRODUCTION

Such terms as “adequacy”, “suitability” or “effectiveness” related to the quality management systems have firstly occurred at the ISO 9001:2000 standard, but without any remarkable or practical impact on these systems. The newest version of this standard published in 2015 (ISO, 2015a) is more exacting in this area: requirements regarding to the quality management systems adequacy, suitability and effectiveness assessment or review are included minimally at two clauses:

a) “Top management shall review the organization´s quality management system at planned intervals, to ensure its continuing suitability, adequacy, effectiveness and alignment with the strategic direction of the organization.” (cl. 9.3.1).

b) “The organization shall continually improve the suitability, adequacy, and effectiveness of the quality management system”. (cl. 10.3).

Additionally, another requirement related to the quality management system performance is repeatedly stressed at different clauses of this standard. When consulting text of this standard in more detail, we are able to discover some serious facts which can influence practical implementation or assessment of the quality management systems against the ISO 9001:2015:

a) the ISO 9001:2015 takes use the terms “adequacy”, “suitability” “effectiveness” or “performance” somewhat arbitrarily without explanation of these terms with relation to the quality management system,

b) the ISO 9001:2015 standard is not concerned with mutual relationships among these terms at all, although these relationships really exist and play important role in practice,

c) the ISO 9001:2015 standard ignores term “efficiency” related to the quality management system although this quality management system´s feature should be vital,

d) these three shortcomings can lead to different interpretation or misunderstandings of all these terms from the point of quality professionals and managers view,

e) but also internal and external auditors will be able to explain these terms differently what can influence objectivity of all types of audits, including third party audits performed by the certification bodies.

Therefore, the main goal of this article is to contribute to elimination of these uncertainties by:

- defining these terms,
- analyzing how these terms are perceived by quality professionals at present,
- developing a set of steps within methodology focused on the quality management systems adequacy, suitability, efficiency and effectiveness assessment and review.

2 METHODOLOGY

To achieve defined goals of this article, a following methods and approaches were used:

- a literature review, especially focused on terms as quality management system adequacy, suitability, effectiveness and efficiency,
- a brainstorming conferences held with groups of quality managers and quality technicians from Czech organizations with aim to reach consensus regarding definition of key terms,
- an empirical field research how the terms as quality management system adequacy, suitability, effectiveness and efficiency are perceived by practice,
- obtained finding synthesis into methodology of the quality management system adequacy, suitability, effectiveness and efficiency assessment and review.

3 LITERATURE REVIEW

Unfortunately, it is not difficult to discover that such terms as quality management system adequacy and suitability are not frequently discussed throughout the world. Overwhelming majority of articles and books deals with term „performance“ only. I can select from this majority following examples: Hoyle describes how to perform the quality management performance review in area of automotive industry (Hoyle, 2009). Oakland proposed a performance measurement framework (Oakland, 2014) and both also recommend some steps for quality management systems performance review, including performance indicators. Gale has already argued that key performance indicator is customer value (Gale, 1994). Neely, et al., 2010 proposed using a process approach principle as a base for performance management system development. Set of various key performance indicators was proposed by (Namešanská, et al., 2014). Závadský and Hiadlovský searched answer to questions about various performance indicators consistency (Závadský and Hiadlovský, 2014). And we can remind also all books from Kaplan and Norton oriented to the Balanced Scorecard methodology implementation – (Kaplan and Norton, 1996; 2006;

2008) for example. This methodology can be used also within special parts of processes. For example, (Bhagwat and Sharma, 2007) introduced their approach to implementation of Balanced Scorecard methodology within supply chain. Striteska and Spickova presented results of analysis and comparison the strong and weak points of the most widely cited performance management systems (Striteska and Spickova, 2012).

But unfortunately, there are only minimum resources where are terms as "adequacy" or "suitability" discussed. We have discovered only two websites which can be referred to mentioned terms: (MAS Solutions, 2015) and (Whittington & Associates, 2015).

Such acute shortage of relevant resources made us to formulate and define key terms ourselves.

4 DEFINING OF KEY TERMS

As it was mentioned above, the ISO 9000:2015 standard does not know such terms as adequacy or suitability with relation to the quality management system in spite of the ISO 9001:2015 standard requires the quality management systems adequacy, suitability and effectiveness assessment and review. That was why we had to define these terms first of all. We have inspired by websites (MAS Solutions, 2015) and (Whittington & Associates, 2015), as well as by the Random House Unabrigded Dictionary (Random House, 2002) on this purpose. Now, we are able to put forward a propoal of following definitons:

Quality management system adequacy: is ability of this system to meet applicable requirements, specified by the organization or standards. For example, the requirements may be about the ISO 9001, contractual, organizational or regulatory demands. Simply to say: adequacy means being equal to the requirements, no more, no less.

Quality management system suitability: is capability or fitness of this system to meet defined purpose. The organizations can identify various kinds of quality management system´s purpose. To guarantee a maximum level of customer´s satisfaction and loyalty, to support improvement culture at the organization or to be a catalyst in the area of organization´s excellence should serve as example of the quality management system´s purpose.

On the contrary, terms effectiveness, efficiency and performance are defined at the ISO 9000:2015 standard by following way:

Effectiveness: extent to which planned activities are realized and planned results are achieved.

Efficiency: relationship between the results achieved and the resources used.

Performance: measurable result.

See also (ISO, 2015b). Let us have a look to these definitions. From the core economic point of view, basic indicator of effectiveness is relation between benefits and costs – see (Boardman, 2011) and many others. And practically: all technical sciences associate the term "efficiency" with evaluation how a certain capacity delivered to input of the technical system is successfully converted to desirable outputs (Fried, Lovell and Schmidt, 1993) or (Hiltner, et al., 2002). As to performance definition: what is measurable result of the quality management system – that is a question! A number of certificates seem to be doubtful result, I am sure. These notes make us to define these terms more preciously:

Quality management system effectiveness: relationship between the results achieved by the quality management system and the resources used. We will consider effective quality management system as system which brings undoubtful economic or social effects.

Quality management system efficiency: extent to which planned activities within the quality management system are realized and planned results are achieved. Briefly, an efficient quality management system must be in rational operation.

Quality management system performance: extent to which quality management system fulfils its functions and goals. By the way: author this term as well as possibilities of this performance measurement has already described (Nenadal, 2016).

When giving all mentioned definitions thought we are able to come to the logic conclusion: strong relationships must exist among all these quality management features! We can depict this fact by Fig. 1.

What can we read from this figure? The quality management system can be suitable and efficient, but this system need not be effective as a large amount of various resources was wasted for example. All arrows illustrated in Fig. 1 can be seen also as hypotheses which wait for future confirmation. Unfortunately, we are not able to confirm these hypotheses at present as it asks for huge amount of relevant data – and these data are simply unobtainable at Czech organizations now.

5 RESULTS OF EMPIRICAL FIELD RESEARCH

As a part of special research project sponsored by VSB-TU of Ostrava we performed an empirical field research in Czech organizations during January and

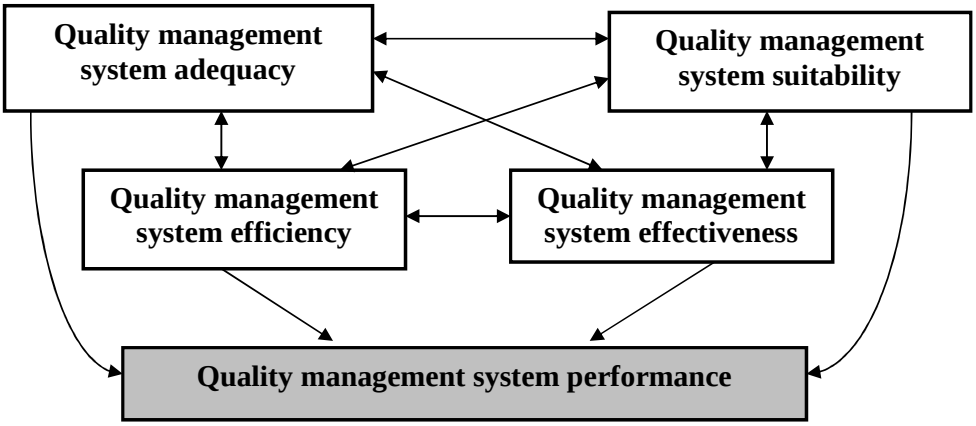

Figure 1 – Mutual relationships among the quality management system´s features

February 2016. A principal goal of this research was to investigate how the terms as adequacy, suitability; effectiveness and efficiency (in relation to the quality management systems) are practically perceived, used and assessed. 172 organizations from various areas of business were randomly selected. Data gathering was based on structured questionnaire which could be filled electronically. Additionally, interviews with some quality professionals were also held. A response rate was 29,7 % what means that 51 organizations gave relevant data for processing. Tab. 1 shows the organization´s distribution from business area point of view.

Table 1 – Organization´s distribution from business area point of view

Business area	Per cent
Automotive industry	19
Machinery	20
Metallurgy	4
Services	8
Chemical industry	10
Civil engineering	14
Food industry	4
Other	21

Of this sample, 49 % were large organizations, on the contrary, only 4 % were organizations with less than 10 employees. 77 % of all organizations had established and certified quality management system minimally against the ISO 9001:2008 standard.

First of all, we launched above mentioned definitions of terms to all respondents and afterwards, the quality professionals had to declare if they understand these definitions. A proportion Yes (I understand it) versus No (I do not understand it) is clear from Fig. 2 – 5:

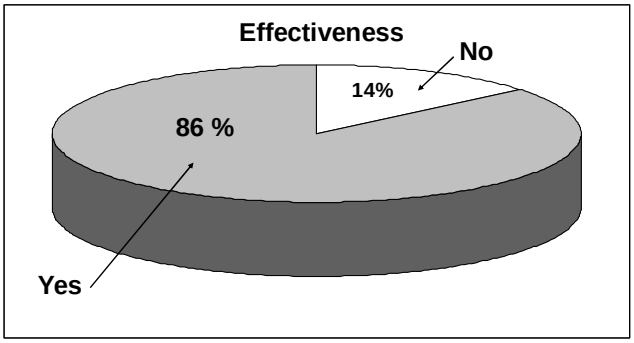

Figure 2 – How the term "quality management system effectiveness" is understood

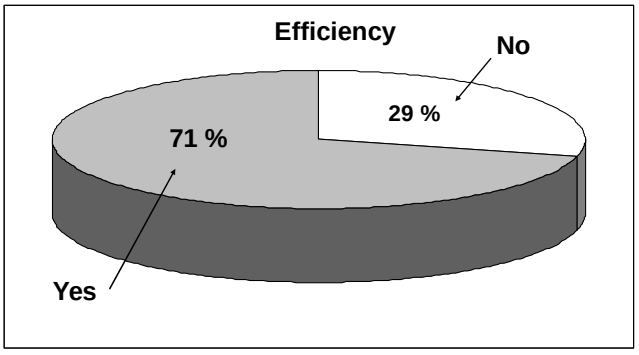

Figure 3 – How the term "quality management system efficiency" is understood

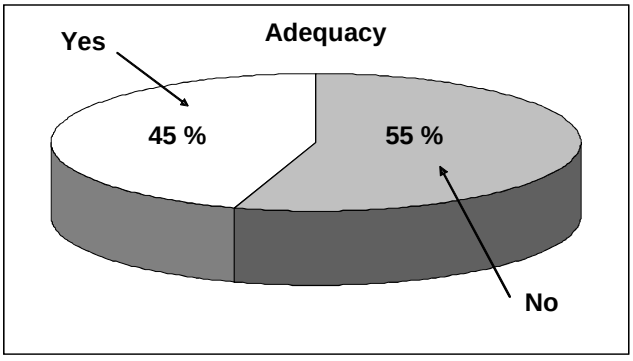

Figure 4 – How the term "quality management system adequacy" is understood

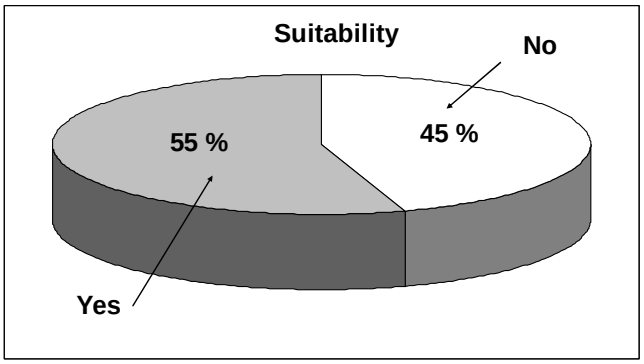

Figure 5 – How the term "quality management system suitability" is understood

The respondents were also asked to describe what approach their organizations apply for quality management system performance assessment: if this system is assessed through individual features as adequacy, suitability, effectiveness and efficiency (it is marked as Yes) or as a whole. Fig. 6 shows results.

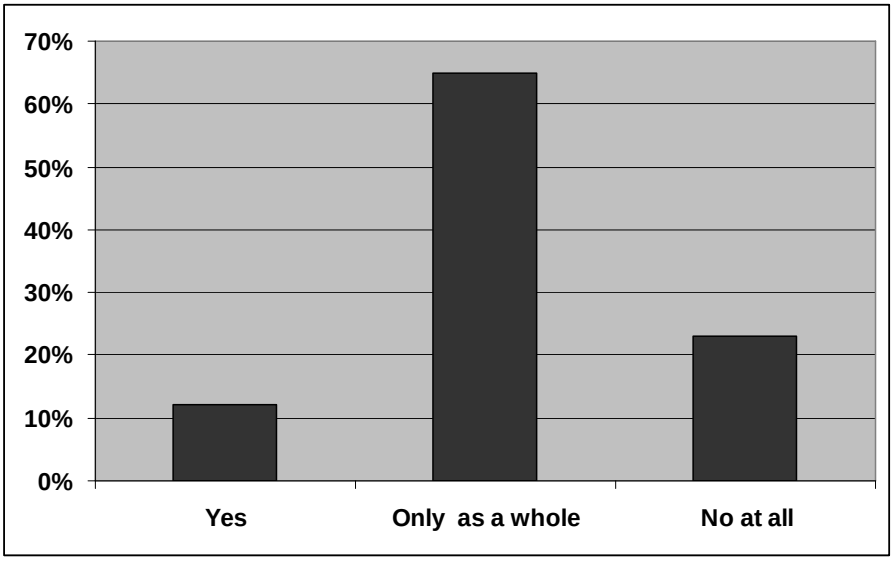

Figure 6 – Approach to quality management system assessment

The organizations which answered "yes" in this case were additionally asked to list specific indicators used for quality management system adequacy, suitability, effectiveness and efficiency evaluation. Analysis of these lists allowed us to recognize that organizations take use wide range of indicators but most of them are not relevant for quality management system features evaluation. For example: we have occurred that indicators related to customer satisfaction or internal auditing are used for evaluation and assessment of all features (such indicators are about efficiency for one organization, while another organizations the same

indicators apply in the field of adequacy, and so on). It is evidence that understanding of discussed terms is little bit confusing in practice, in spite of fact, that the same respondents declared sooner that these terms are fully understandable for them!

We are able to summarize main lessons learned from this empirical study:

a) the organizations have not mostly a problem to understand terms "effectiveness" or "efficiency" inversely against the ISO 9000:2015 definitions,

b) but 50 % of organizations or so have problems related to the terms "adequacy" or "suitability",

c) the most of organizations are not aware of fact that effectiveness, efficiency, adequacy or suitability represents only a partial features of overall quality management systems performance,

d) the approach to the quality management systems performance assessment as a whole seems to be logic and rationale. On the contrary: such information that 23 % of organizations do not generally perform this type of assessment is strongly correlative of number of organizations without quality management system certification,

e) quality professionals are mostly confused when assign relevant indicators to such features of the quality management systems performance as effectiveness, efficiency, adequacy and suitability really are.

Therefore we see as challenge all answers obtained to the last question within the survey, focused on exploring if the organizations are interesting in special methodology for quality management system´s adequacy, suitability, effectiveness, efficiency and performance assessment: 89 % of all respondents declared this concern without any hesitation as they perceive low level of knowledge in this field on one hand and as important hindrance to objective and fair quality management system assessment and review on the other hand.

6 FUNDAMENTALS OF QUALITY MANAGEMENT SYSTEMS PERFORMANCE ASSESSMENT

Before anything else, we must identify set of indicators corresponding with particular features of the quality management system performance. A proposal of such set of indicators is presented by Tab. 2 – Tab. 5.

Table 2 – Indicators for the quality management system suitability assessment

Quality management system feature	Indicators related to
Quality management system suitability as capability or fitness of this system to meet defined purpose.	• level of customer satisfaction • level of customer loyalty • level of employee satisfaction • number of improvement or innovation proposals related to one employee • level of customer value • number of employees involved to improvement teams related to total number of employees • total amount of sales of new or innovated products related to total turnover, etc.

Table 3 – Indicators for the quality management system adequacy assessment

Quality management system feature	Indicators related to
Quality management system adequacy as ability of this system to meet applicable requirements, specified by the organization or standards.	• results of all kinds of audits • volume of nonconforming products related to total outputs • results of management system self-assessment • results of benchmarking • input yield • process capability indexes • average response time to interested parties requirements • level of retained certificates successfully, etc.

Table 4 – Indicators for the quality management system efficiency assessment

Quality management system feature	Indicators related to
Quality management system efficiency as an extent to which planned activities within the quality management system are realized and planned results are achieved.	• prevention cost to total quality related cost ratio • per cent of non fulfilled correction actions within required period of time • level of APQP (Advanced product Quality Planning) scheduled activities realization • not fulfilled handed contracts to sales ratio • volume of warranty claims or complaints related to sales • number of non conformities discovered by customers to products sold ratio • index of risk level change, • extent of quality objectives fulfilment, etc.

Table 5 – Indicators for the quality management system effectiveness assessment

Quality management system feature	Indicators related to
Quality management system effectiveness as relationship between the results achieved by the quality management system and the resources used.	• return of quality management system investment • internal failure cost to total cost ratio • external failure cost to total cost ratio • total quality related cost to total cost ratio • value of key customers • average profit from one quality improvement project • level of employees training effectiveness • overall equipment effectiveness, etc.

The list of indicators presented by these tables must not be considered as comprehensive set of course – it is only about examples! Various organizations could be able to define some others indicators describing such features of their quality management systems, as adequacy, suitability, effectiveness or efficiency are. If we realize that all features describe also quality management system overall performance, we look upon each of these indicators also as relevant performance characteristic! Even though, correct assignment of indicators is important, but not crucial part of the quality management systems performance assessment. Therefore, let me introduce all general steps which seem to be necessary to implement rationale performance assessment within establishing, maintenance and improvement of the quality management system regardless the type or size of the organizations:

1) The top management must define and communicate purpose, goals and functions of the organization´s quality management system. Establishing of quality policy, which is required by cl. 5.1 of the ISO 9001:2015 (ISO, 2015a), is not sufficient.
2) All managers of the organization must understand each area of quality management system performance. It means that they have to see all aspects of quality management system adequacy, suitability, efficiency and effectiveness as useful and rationale and they must support corresponding measurement and monitoring.
3) The top management must make a decision if the organization´s quality management system performance will be assessed and monitored as a whole, or within its particular features as adequacy, suitability, efficiency and effectiveness. Any approach can be applicable; a choice depends solely on the organizational environment.
4) Anyway, it is necessary to establish relevant set of indicators for each quality management system performance feature. Tables 2 – 5 should serve as possible inspiration. Management representative (or another function) of the organization as well as process owners should approve these indicators before releasing.

5) Each of approved indicators must be described by mathematic formula. All necessary responsibilities and authorities related to data gathering and processing must be assigned to individual people. Such set of information should be maintained through relevant documented information.
6) Top managers must develop efficient and effective ways of the quality management system performance data reporting and communication. Platform of so called management review, asked by the ISO 9001:2015 at cl. 9.3 (ISO, 2015a) could serve as minimum on this purpose.
7) Top managers must ensure close link between management review actions and continual improvement as I have already mentioned, cl. 10.3 of the ISO 9001:2015 requires that the organization shall continually improve the suitability, adequacy, and effectiveness of the quality management system. And then: efficiency of implemented improvement actions should be measured and monitored. A performance loop is closed!

7 CONCLUSION

I have mentioned some serious facts which can influence practical implementation or assessment of the quality management systems performance against the ISO 9001:2015 in the introduction of this paper. A confusing attribute of the ISO 9001:2015 is hidden at clauses of this standard which require assessment of the quality management system adequacy, suitability, effectiveness and efficiency in spite of these terms are not defined at all or are defined incorrectly. Therefore this article brings the own explanation of these terms and on a basis of the empirical field research findings proposes fundamental steps of all features of quality management system´s performance measurement and assessment, including set of relevant indicators.

The main implications for various organizations are:

- the organizations can understand new requirements of the ISO 9001:2015 standard much easier,
- the organizations can see this paper as guideline for the quality management system assessment and review based on facts,
- understanding of terms as adequacy, suitability, effectiveness, efficiency or performance by organization´s managers and external auditors will enable to reach mutual comprehension and eliminate possible conflicts,
- the paper should be seen as initial impulse for all who are interested in the quality management systems development.

Opinions and proposals included to this article are expected to future refinement of course.

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Logistics Simulation Game Proposal – a Tool for Employees' Induction

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ABSTRACT

Purpose: The main purpose of this paper is to propose the development of a simulation game and to explain the use of the proposed logistics simulation game in the induction programme of new employees in real company settings.

Methodology/Approach: The proposed logistics simulation game is based on a conceptual modelling framework – mostly a specification of the parameters and variables, and the relationships between them, as well as the adjustment of the game to the real conditions and company's requirements.

Findings: The proposed simulation game enables new employees to learn to manage internal transportation in a way that would achieve the lowest level of connected logistics costs together with the maximum use of production lines capacity per single shift.

Research Limitation/Implication: The logic of creating a simulation game is universal. An applicable simulation game has to be tailored to a particular company and the requirements of an induction programme to a specific job. The proposed simulation game was tested in a specific company; its application in different types of companies would be needed in future.

Originality/Value of Paper: The induction programme has rarely been the subject of theory and research, in comparison to other functions of human resource management. Thus, the paper contributes to theory and practice by presenting the partial results of research focused on an innovative approach in the induction training of new employees in a logistics department.

Category: General review

Keywords: employees' induction; simulation game construction; logistics

1 INTRODUCTION

The formal induction of new employees to a company is a planned and organised process that can increase efficiency and shorten the period of integration of new employees to the company, and working and social environment, as well as the familiarisation with job tasks and working conditions. The purpose of the induction is to ensure that employees understand their job tasks and achieve the required job performance as soon as possible. The importance of the adaptation of new employees is increased by the fact that "employees are entering and exiting jobs more frequently than 50 years ago" (Simosi, 2010), however, it is still under-rated in both theory and company practice, in comparison to other fields of human resource management (e.g. Wanous and Reichers, 2000; Armstrong, 2009). This paper is the result of partial research focused on an innovative approach in human resource management in the field of the induction of new employees. It is applied to new employees in the logistics department. The objective of the paper is to present the logic of the development of a simulation game and to explicate the use of a specific logistics simulation game in the induction programme of new employees in the real setting of a selected company. Employees passing the logistic game can verify their understanding of their responsibilities, clarify the activities that will be in their job description and understand the interconnections before their actual performance of the tasks and assuming responsibility for these tasks. Employees are monitored during the specific induction programme that helps to prevent potential problems and to eliminate costs due to errors or the incompetence of employees.

2 THEORETICAL BACKGROUND

This section describes the definition of a simulation including its value in a real work setting. The basics of the induction, its effects and training as a part of the induction are also presented.

2.1 Definition of simulation and its use

The term simulation can be defined in various ways concerning the level of universality. Klabbers (2009) lists the terms that are related to the game, referring to their common use, and he describes simulation as "the process of simulating something, that is, reproducing a set of conditions, or the result of simulating it", and as "an attempt to solve a problem or to work out the consequences of doing something by representing the problem or possible course of events mathematically, often using a computer". Taking into account the focus of this paper, more specific definitions of simulation are described. To acquire information through experiment is defined as: "Simulation is a technique which replaces the dynamic system by a model with the aim of getting information about the system through experiments with the model" (Dahl, 1967). For a better focus on the system under examination, a specification of the system is aimed as:

"the process of the real system model, the execution of the experiments by this model to achieve a better understanding of the studied system behaviour or to assess different alternatives of the activity" (Shannon, 1975). We understand the simulation in this paper as an experimental method in which we replace the real system by the model.

Logistics is a very suitable area for using simulation games as stated by several authors (Debnár, Košturiak and Kuric, 2000). It is possible to simulate quite a lot of activities and to gain experience in different logistics functions in a safe environment.

Simulation is usually used to achieve one of the following goals (they are partially simultaneous):

- To understand a real (model) system,
- For the parametric study of a real system (finding the influence of changing parameters on the system's functioning),
- As an alternative to experiments on the real system – if the real systems are expensive, long or dangerous (Hušek and Lauber, 1987).

2.2 The induction of new employees

Generally, induction can be explained as "a formal introduction to a new job" (Dorling Kindersley, 1999). It is also known as orientation, introduction or socialisation, less formally as "onboarding" (e.g. Wanous and Reichers, 2000; Grobler, et al., 2006; Lawson, 2006; Armstrong, 2009; Bradt, 2014). More precisely, induction is "the process of receiving and welcoming employees when they first join a company and giving them the basic information they need to settle down quickly and happily and start work" (Armstrong, 2009, p.603). Grobler and colleagues (2006) define induction as "the process of integrating the new employee into the organisation and acquainting him or her with the details and requirement of the job…It not only involves the job training of new employees but also the whole process of integrating employees into the organisation." Although work induction interrelates with social induction (Bedrnová, et al., 2002; Bláha, Mateiciuc and Kaňáková, 2005; Antonacopoulou and Güttel, 2010), we focus on work induction in the paper – the induction to the department and the induction to the specific job position that is realised by the training of new employees. Anderson, Cunningham-Snell and Haigh (1996) present the results of a survey among a British organisation, which indicates that "over 90% of organizations conduct formalised induction programmes in the early stage of newcomer socialization".

Induction is important to prevent new employees' resignation due to inconvenience, stress and problems immediately after joining the organisation. The aims of induction include smoothing the preliminary stages for new employees, quickly establishing a favourable attitude to the organisation in the

mind of new employees so that they are more likely to stay, obtaining effective output from the new employee in the shortest possible time and reducing the likelihood of the employee leaving early (Armstrong, 2009). Similarly, Acevedo and Yancey (2011) include among the benefits of a proper induction programme "improving the person-job fit, reducing turnover and absenteeism, and increasing employee commitment and job satisfaction".

From an economic point of view, induction reduces the costs associated with repeated recruitment and the other costs of employee turnover, such as training, lost production and the costs arising in the period when the job position is not staffed (Armstrong, 2009; Dvořáková, et al., 2012). According to Armstrong (2009) these costs "for a professional employee could be 75 per cent of annual salary. For a support worker the cost could easily reach 50 per cent of pay". Dahl (2013) states that "the cost to bring on a new employee can range as high as 150 per cent of that person's salary". Without a consideration of the actual amount of the costs, the importance of formal induction is evident for any company from a cost perspective.

2.3 Simulation training as part of an induction programme

Orientation programmes are sometimes distinguished from training. Wanous and Reichers (2000) present the differences between orientation and training. These include the focus of orientation on the performance context and of training on task performance, and the timing difference between them including the level of stress associated with the entry. Still, there are several similarities (Wanous and Reichers, 2000) – "both are primarily concerned with organizational influence on employees, rather than the reverse", "both are programs rather than processes" and also, "it is often difficult to evaluate the effectiveness of the various individual components of the program". We consider the entry training programme as part of the orientation programme in this paper, as we narrow the focus of our application to departmental induction and specific job induction.

Bradt (2014) presents the results of an onboarding survey conducted by BambooHR's founder and COO Ryan Sanders, released on 19 March 2014. The survey highlights that a combination of three components has an impact on the effectiveness of the onboarding programme, such as the impact of the manager, on-the-job training and the extended timeframe of the induction. According to the results "76% of respondents agree that on-the-job training is the most important thing a new employee needs to get up to speed and begin contributing quickly" (Bradt, 2014).

Kirkpatrick's Four-Level model evaluating training programmes, originally introduced by the author in 1959 and revised in 1996 (Kirkpatrick, 1996) can be used to evaluate an induction training programme at four levels: reaction of participants, learning, behaviour and results. The effects of the induction training can only be estimated, as the results are difficult to quantify and the contribution

of the induction training to improved results is not always unambiguous due to the impact of other factors. The results of orientation training that can be measured "could include any of the following factors (Lawson, 2006): safety record, turnover rate, absenteeism, employee grievances, and employee satisfaction".

In the learning process, simulation techniques provide the opportunity to deal with virtual situations which bear resemblance to those that are to be solved in real life (Cano and Sáenz, 1999). The experience gained in using one of the simulation models ("Beer Game") in training sessions is given, for example, by Hieber and Hartel (2003).

Simulations used in on-the-job induction training offer many benefits both to the newly hired and to the company. The simulated environment takes on all the characteristics and variables faced in the employment, but the new employees gain new knowledge and experience without the risk of making costly mistakes for the company. "In light of the comparable cost to conventional training, the additional benefits of decreased delivery time and improved performance over a shorter duration make simulated learning an effective tool for both cost and efficacy" (Hritz, 2013). Similar conclusions have been reached by Zgodavova, Kisela and Sutoova (2016) from the experience in applying the role-play simulation in the learning, e.g. reduction of costs, process improvement, but also positive attitude of the players and managers to the simulation.

3 METHODOLOGY

The main purpose of this paper is to propose a simulation game construction and to explain the use of the proposed logistic simulation game in the induction programme of new employees in a real company setting.

The construction of the logistics simulation game is based on a conceptual modelling framework for simulation-based serious gaming (Zee, Holkenborg, and Robinson, 2012). Shannon's (1975) approach to conceptual modelling is used as the basis of the paper, in which he distinguishes four steps in conceptual modelling:

- specification of the model's purpose;
- specification of the model's components;
- specification of the parameters and variables associated with the components;
- specification of the relationships between the components, parameters and variables.

The process of constructing the logistic simulation game is based on two main ideas:

1) Using the parameters and variables which other simulation games use, and the goal of the games: For the specification of the parameters which can occur in the particular games and the specification, which participants in the games work with, the parameter, variables and the goal of the game used in other logistic simulation games were compared and described. Six logistic simulation games were chosen, that are commonly known and used in logistics applications (Lane, 1995; Forssén-Nyberg and Hakamäki, 1998; Cano and Sáenz, 1999; Hieber and Hartel, 2003; Harrison and Hoek, 2008; Brotherton, Montreuil, and Naccache, 2012; Riemer, 2007, 2012; Thompson and Badizadegan, 2015):

   - Beer game (BG),
   - Mit Beer game (MBG),
   - The International Logistics Management Game (ILMG),
   - Cornell University students game (CU)
   - Global player (GP),
   - JISEL, created by the Groupe ESC in Bordeaux.

2) The adjustment of the game to real conditions and the company's demands, so the proposed game can be used as a tool for the employees' adaptation to real working conditions. The purpose of the induction training of employees is to acquire applicable knowledge on the daily work. To adjust the logistics simulation game to the real conditions in a company, the company's requirements in the logistics simulation game were examined.

The comparison of parameters, variables and the goals of the game is mentioned in subsection 4.1. The proposed logistics simulation game in a real company setting is presented in subsection 4.2. The subject of the case study was a manufacturer of electric motors for home appliances, operating in Slovakia since 1993. The process of the construction of the logistics simulation game consisted of selecting parameters, variables and the goal of the game and their descriptions, as well. The problem was formally written down including the definitions of the relations. Then, the main results of the test of the game are presented. In subsection 4.3, four steps for the realisation of the proposed logistics simulation game were set and an evaluation of the application of the logistics simulation game for the employees' induction was suggested.

4 RESULTS

4.1 Comparison of parameters, variables and the goals of the games

Different parameters and variables are used in the games. They come from their range, complexity orientation, the goal of the game and the target group for which the games have been aimed.

To clearly describe the use of the parameters and variables in each game, a comparison of them is presented in Table 1.

Table 1 – Parameters, variables and the goal of the game in the selected simulation games

Game						
Parameter	**BG**	**MBG**	**ILMG**	**CU**	**GP**	**JISEL**
Means of transportation	Y	Y	Y	Y	Y	Y
Suppliers/producers		Y	Y	Y	Y	Y
Distributors/carriers		Y	Y	Y	Y	Y
Purchasers			Y	Y	Y	Y
Distance			Y	Y	Y	Y
Wholesale	Y	Y	Y			Y
Retail business	Y	Y	Y			Y
Storage houses			Y	Y		Y
Markets			Y			Y
Variable						
The amount of the realisation	Y	Y	Y	Y		Y
The direction of the carrier					Y	
The goal of the game						
The management of the carriage	Y	Y	Y	Y	Y	Y
The management of the storage			Y	Y		Y

Source: the authors

In Table 1, the following analysed games are compared: Beer game (BG – three parameters, one variable, the goal of the game is to manage the carriage), Mit Beer game (MBG, five parameters, one variable, the goal of the game is to manage the carriage), The International Logistics Management Game (ILMG – nine parameters, one variable, the goal of the game is to manage the carriage and to manage the storage), Cornell University students game (CU: six parameters, one variable, the goal of the game is to manage the carriage and to manage the

storage), Global player (GP: five parameters, one variable, the goal of the game is to manage the carriage) and JISEL created by the Groupe ESC in Bordeaux (nine parameters, one variable and two goals of the game).

To compare single games it was necessary to set up certain common definitions of the parameters and variables. That is the reason for giving an explanation of the information in Table 1 by giving the characteristics of each parameter and variable.

The characteristics of parameters used:

- The means of transportation are taken as the carriage capacity, the speed, the number of vehicles and the distribution of the vehicles,
- Suppliers/producers are the number, the distribution, the supplier/production capacity and the number of request,
- Distributors/carriers are understood primary from the point of view of the transportation capacity and limits,
- Purchasers are understood as purchaser density, production (supplier) capacity and prices,
- Distances are understood as physical or time constant influencing transportation costs and the capacity,
- Wholesalers and retail businesses are taken primary from the point of view of the capacity, distribution and orders,
- Storage houses are the capacities, distributions and the amount of the fixed costs (lodgings),
- Markets are understood as the market capacity, turnover and branch.

The characteristics of the variables used:

- The amount of realisation is understood as a result of the financial management or the profit, while the revenues come from the retail activities of buying or selling, and the depth of the costs structure is very variable and usually made up of the transportation costs and the fixed costs (in a varied structure),
- The direction of the carrier means the management of the material flows from a time and cost point of view.

The most frequent parameters used in simulation games are: the means of transportation, then the suppliers and the distributors. The most common variable used in logistic simulation games is the amount of the realisation in different

aspects. This points at the most common problems which are in the area of company's logistics and which the managers have to solve.

The general goal of the game is to manage the carriage. From the wider point of view, the management of the storage is used as the other goal of the game.

4.2 Proposed logistics simulation game – case study

The logistics simulation game was proposed for a large company producing electric motors for home appliances. The logistics problems cover the logistics activities in the factory, among the storage places and the production lines.

The real conditions and company's requirements for the goals, the variables and the parameters of the game were examined and are shown in Table 2.

Table 2 – The company's requirements in the logistics simulation game

The requirements to adjust in the game	***The alternatives***
The existing means of transportation	3 (the milk run vehicle, the trailer, the high lift)
The existing production lines	6 (the different lines with different maximum norms)
The existing types of covers	4 (the Gitterbox, the euro pallet, the euro pallet EWP - not refundable, one direction and the box)
The existing input material and the norms of the consumption of the input materials	As the directions of the game
The priorities in the goals	1. The maximum use of all lines' capacities 2. Cost minimisation

Source: the authors

Stemming from the logic of the logistics simulation game, the parameters and the variables used in analysed games (Table 1) and the company's requirements (Table 2) have been taken into consideration. The proposal of the specific logistics simulation game can be introduced (Table 3).

Table 3 – The parameters, the variables and the goal of the game in the proposed logistics simulation game

Parameter	**Description**
Means of transportation	The vehicle's capacity, the way of putting materials in the vehicle
Purchasers	The production line capacity per single shift in physical units
Suppliers/producers	The input and output per specific production line
Distributors/carriers	The types of vehicles, the capacity of the vehicles, the way of using the vehicles for inputs and outputs

Parameter	**Description**
Covers	The type of cover, the type of cover unit with the specification of maximum carriage
Material	The norms of consumptions of input materials per single unit of output, the list of materials with the physical parameters, the specification of input materials with the relevant characteristics
Variable	
The amount of the realisation	The use of the production line, the energy consumption and fuels used by the vehicles, the frequency and the vehicles routes
The goal of the game	
The management of the transportation	Logistics costs, the use of the production lines 'capacity

Source: the authors

The goal of the game is to manage the transportation in a way which would bring the lowest level of related logistics costs together with the maximum use of the production lines' capacity per single shift.

During the simulation game, the worker makes decisions in which s/he proposes the values of the variables in the logistics activities to achieve the goal of the game. The aim is to verify if the worker understands his obligations, to clarify the activities which s/he has to do and for which s/he will be responsible and make sure s/he understands the mutual connections. The game evaluation is based on a comparison of the results obtained by the worker with the optimal task solution and with his or her previous results.

Formally, the problem can be written down as

$$f(\overline{X}, \overline{Y}, \overline{x}) = \sum_{i=1}^{4} X_i \,.\, No_i + \sum_{j=1}^{3} Y_j \,.\, Np_j + \sum_{k=1}^{N} x_k \,.\, Nm_k \rightarrow \text{opt (min)} \qquad (1)$$

$$\sum_{k=1}^{N} x_k \,.\, g_k \leq X_i^H \qquad \text{for i = 1, 2, 3, 4} \qquad (2)$$

$$\sum_{i=1}^{4} X_i \,.\, \sum_{k=1}^{N} x_k \,.\, g_k \leq Y_j^H \qquad \text{for j = 1, 2, 3} \qquad (3)$$

$$\sum_{j=1}^{3} b_j \,.\, Y_j \leq b^H \qquad (4)$$

$$X_i \geq 0,\ Y_j \geq 0,\ b_j \geq 0,\ x_k \geq 0 \qquad (5)$$

Where:

$\overline{X}$ is the decision about the number of different types of covers needed in one shift; in our case it was possible to use four different types of covers,

$\bar{Y}$ is the decision about the number of different forms of internal transportation used during one shift; in our case we could use three different types of vehicles,

$\bar{x}$ is the decision about the amount of materials used during one shift, in our case we could use thirty different materials,

N is the number of material types,

X_i is the number of *i* used covers during one shift,

Y_j is the number of carriages in *j* form of internal transportation during one shift,

x_k is the number of units of *k* material,

g_k is the weight of the *k* material unit,

b_j is the elaborateness connected with one use of *j* mean of transportation,

No_i costs connected with the use of *i* cover type,

Np_j costs connected with the use of *j* type of mean of transportation,

Nm_k costs connected with the manipulation with the unit of k material,

X_i^H is the bearing capacity of *i* cover type,

Y_j^H the capacity of *j* type of mean of transportation,

b^H is the available labour time fund of the warehouseman.

The relations (2), (3) and (4) represent the maximum level for the task solution. The relations (5) represent the standard low level for the task solution.

The proposed logistics simulation game was tested by new workers in the logistics department of the manufacturer. The results achieved by a worker with no work experience of planning the transportation of material among production lines are presented. It should be noted that the worker had some knowledge of similar partial logistics operations from previous employment (e.g. storage or working with trailers and high lifts). Also, it was the first experience of the worker with a simulation game.

The worker played two rounds of the simulation game. The first round was primarily aimed at the understanding of game philosophy. The comparison of the results of the second round is presented in Table 4.

Table 4 – The results of the proposed simulation game (2nd round)

Solution	**Total costs – relative value**
Optimal	100,0%
Player	108,5%

Source: the authors

The relative value of the total costs of the worker playing the game (108,5%) is above the optimal level. On the other hand, the result is considered as relatively sufficient and it shows the understanding of the philosophy of problem solving.

The partial results related to the use of the types of vehicles were the most interesting. The results proved the tendency to use the same types of vehicles the worker had experienced before (Table 5).

Table 5 – The number of the use of the types of vehicles (2nd round)

Solution	**Type of vehicles**			**Total**
	the milk run vehicle	**the trailer**	**the high lift**	
Optimal	112	13	13	138
Player	100	30	26	156

Source: the authors

The results in next rounds should be compared not only to the optimal solution, but also to the outcomes from previous rounds to verify the progress of the worker as it is possible to play the game repeatedly.

The proposed logistics simulation game is suitable for the use with required adjustments in all manufacturing companies that have similar restrictions. Before, it is necessary to interface with business strategy and objectives, similarly to the models in project management (see Majtán, Mizla and Mizla, 2014).

4.3 The proposed logistics simulation game as part of induction training

After a general induction programme that is usually focused on the company's standard information, practices and policies, the specific training of newly hired staff follows in the logistics department (e. g. Daly, et al., 2009). The logistics simulation game is realised cyclically through four steps:

Step 1 – Initiation: The employees get acquainted with the scenario of the game, with new data and information, or with the results of the previous cycle.

Step 2 – Planning: The processing of available information, its analysis with subsequent decisions to solve problems are included in this step.

Step 3 – Action: During the action stage, the activities leading to the established goals are performed, on the basis of the decisions made according to the results of the previous step.

Step 4 – Evaluation: The results of the cycle are under discussion. Consequently, the simulation ends, or the worker returns to the first step.

Planning of the application of the simulation game also includes a decision on the required outcome of the game, which the employee has to achieve and the decision on a further process of the induction programme in the case where the worker fails repeatedly.

The successful application of the logistics simulation game can be evaluated in the company by comparison of the results before and after the use of the simulation game. Evaluation includes:

- verifying the professional competence of the new employee by using pre-test and post-test;
- estimating the costs that might occur in the case of a failure in the real fulfilment of working tasks,
- the period of induction, when the required work performance is not completely achieved by the worker.

Simultaneously, a well-planned induction brings other benefits, as it is a helpful tool for the stabilisation of new employees by reducing the stress and inconvenience of being responsible for real tasks.

5 CONCLUSION

The purpose of the paper was to propose a logistics simulation game with a specific use as part of the induction training of new employees in the logistics departments. The paper contributes to the theory focused on the induction programme, as this topic has rarely been discussed.

The proposed simulation game emerged from a comparison of other simulation games used in logistics. The aim of the game is to manage internal transportation and to achieve the required logistics costs and use of the production line capacity per single shift. The simulation game is universal and feasible in logistics companies and manufacturing companies with logistics departments, willing to use new training methods in the induction training of new employees. Before the application, the simulation game has to be adjusted to the real conditions and company's requirements, and then experimented. The proposed simulation game was applied in a particular company, and its application in other types of companies would be needed to verify its general applicability. Future research aimed at the specific problems with the use of the simulation game in different companies and the impact of simulation training on the induction of new employees is desirable. For instance, it would be worthwhile to examine the cost savings and length of period of induction with using the logistic simulation game in the induction process.

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Design of an Innovative Business Model for Mobile Virtual Network Operators

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ABSTRACT

Purpose: The article studies a possible innovative business model for sustainable competitive advantage in current communication technologies.

Methodology/Approach: This ethnographic approach consists of contextual interviews with company managers and specialists. Scientific observation and comparison took preference over other methods for the evaluation of results. Comparison methods were used for comparing price levels of telecommunication services within OECD countries and used for characterizing virtual operators. This method of modelling was applied to both corporate process-design and functions.

Findings: This paper proposes a normative model as the foundation for a virtual operator that would be generally applicable by any potential newcomer to the budding virtual telecommunication market.

Research Limitation: Business model innovation in the virtual mobile operator area is a quite new concept, which is still under development. For that reason the validation of the model has not been fully completed until now.

Originality/Value of paper: The paper demonstrates this quite new approach to business model development and its possible application in the area of virtual mobile operators.

Category: Conceptual paper

Keywords: virtual operator; telecommunications; business model innovation; sustainable innovation; structural modelling.

1 INTRODUCTION

The establishment of a new business model in a newly developing business area such as mobile operator network services is always a great challenge both for newcomers and incumbents. Based on the commonly accepted idea that functional business models are valued above technical perfection of the product, newcomers using a well-established business model can often outplay incumbents.

The quickly developing branch of mobile operator services has undergone radical changes over past ten years. The mobile virtual operator establishment implemented some quite new business models, ambushing the existing oligopoly structure of operators while offering quite cheap and flexible services. This so called ‘‘disruptive innovation’’ represents a process whereby a smaller company with fewer resources may successfully challenge established incumbent businesses (Christensen, Raynor and McDonald, 2015).

The establishment and implementation of a new business model in order to be feasible and functional should be subject to certain formalised principles to avoid either misconceptions or failures. These ‘‘normative models’’ usually combine theoretical principles with empirical findings to arrive at a structured process for implementing the process in question. ‘Business models’ explain who your customers are and how you plan to make money by providing them with value; strategy identifies how you will beat competitors by being different’ (Abraham, 2013).

Business model innovation usually represents fundamentally different method of making money compared to any previously well established and perceived processes. Business model innovation is viewed as a powerful way to transform existing markets or create entirely new ones (Giesen, et al., 2007). The new business model as a breakthrough innovation concept has already been addressed by various authors (Davila, Epstein and Shelton, 2006; Tidd, Bessant and Pavitt, 2007) and is considered an important source of competitive advantage and business performance.

Information and communication technologies (ICTs) offer unprecedented opportunities to rearrange value creation activities in new and different ways. In order to go deeper into this principle, the authors of this article examined new business model functions in the information technology business branch. Opting for this business area was driven by the fact that it has become almost the daily assignment for management to undergo rapid development and simultaneously look for new competitive advantages.

Over the course of time telecommunication companies have nearly exhausted new technology possibilities and all operate on equal technological standards. For instance, all three telecommunication operators in the Czech Republic[1] offer

[1] O2, T-Mobile and Vodafone

the same technological platform and quite equal levels of technical support to customers. Moreover, their pricing policies, notwithstanding intrigue and hardly understandable tariff bundles, also lost their magic to attract customers. One possible way to find a way out of this problem is to embark upon a new business model, which might help all parties concerned – the current operator, new (virtual) operator and end-users. Such an idea, when transformed into a full operating model should result in a win-win-win situation, where all three parties involved in a new business can score success.

Searching for well-designed and functional business model in the mobile operator branch showed that such a normative model had not yet been developed. We hope to close this gap with our study. The normative model describing the key procedural steps for the establishment of virtual mobile operator represents the main benefit of this paper.

These conclusions are supported by the recent development of the market share of virtual mobile operators in the Czech Republic as shown the Table 1.

Table 1 - Market share development of virtual mobile operators in the Czech Republic

Year	2011	2012	2013	2014	2015
Market share (%)	0	0.06	1.15	6.53	6.81

Source: ČTÚ (2016)

2 THEORETICAL FRAMEWORK

Despite lacking a commonly accepted definition of the concept (Zott, Amit and Massa, 2011), business models can be understood as a firm´s comprehensive 'design or architecture of the value creation, delivery and capture mechanism' (Teece, 2010). Their main objective is to serve a company by commercialising its ideas and innovations. Business models comprise all elements relevant to the value offering provided to the firm´s target customers, including internal and external value creation as well as its underlying resources and capabilities, along with the revenue generation logic applied by the firm. The logic of customer value resides at the core of business models. Value creation results either from the efficient provision of existing or generating new value propositions (Zott, Amit and Massa, 2010).

Amit and Zott (2012) define the business innovation model by three primary elements: (1) content – the activity to be performed, (2) structure – how and in what sequence activities are linked, (3) governance – which performs the activities. Osterwalder and Pigneur (2010) declare the roots of the business model as the rationale for how an organization creates, delivers and captures value. Keeley, et al. (2013) characterises business model innovation by the number of attributes of a business that are changed.

Sustainability is one of set values that are increasingly a driver and target of business model innovation. Sustainability of business model innovation repeatedly explores the innovative business models that support sustainable technologies (Goebble, 2014). Such business model innovation is a method for firms to re-conceptualise the purpose of the firm and its value-creation logic to improve both its environmental and social sustainability (Bocken, et al., 2014).

Business model innovation is recognized as a key to the creation of sustainable business (Carayannis, Sindakis and Walter, 2015). Business model innovations for sustainability are innovations that create significant positives or significantly reduce negative impacts for the environment and/or society, through changes in the way the organisation and its value-network create, deliver and capture value or change their value proposition (Bocken, et al., 2014). Bocken, et al. (2014) introduced a more comprehensive view of how firms should approach embedding sustainability in their business models, by introducing sustainable business models innovation archetypes. These are introduced to develop a common language that can be used to accelerate the development of sustainable business models in research and practice (Laukkanen and Patala, 2014).

Business innovation models are conventionally focused on the firm´s internal strategic activities, but these activities are greatly affected by the institutional environment in which the firms operate (Zott and Amit, 2007). They describe the rationale of how organisations create, deliver, and capture value (Osterwalder and Pignneur, 2010).

Changing markets and environmental forces have caused established firms to constantly rethink their existing business models, providing a new source of competitive advantage. A business model is described as a system of independent activities and it manifests in the causal relationship between choices and consequences (Casadesus-Masanell and Ricart, 2010). In one case an innovative business model occurs when a business model is invented in response to a demand and is then successfully implemented in practice. In a second case the new business model is required by the market. In both cases it is unclear at the beginning whether the business model will be useful as a market solution, or which business model will respond best to the demands of the market (Chesbrough and Rosenbloom, 2002).

An innovative business model can be a principal-based innovation or gradual with marginal changes (Bourreau, Gensollen and Moreau, 2012). Every company must design its own business model according to specific individual circumstances. Business model innovation as a new form of innovation plays a major role in sustainable company success, and is a tool for transformation and renewal (Demil and Lecocq, 2010). Competitive advantage must be built on strategic assets, such as a unique product, differential power in the channel, a speed to market advantage or some form of informational advantage. While business model innovation may require new capabilities, these new capabilities will constitute business innovation only when they significantly disrupt the competitive dynamics of an industry (Euchner and Ganguly, 2014).

Opportunity exploration is commonly characterised as a multi-step process, involving various levels that lead from a broad idea to a feasible solution (Dimov, 2007). Opportunities involve the potential to generate some type of profit and involve certain kinds of improvement, innovation or imitation to compensate existing market inefficiencies (Singh, 2001). Being prepared in terms of constantly scanning the environment, connecting pieces of information, and evaluating the derived information are considered dimensions of individual´s alertness (Tang, Kacmar and Busenitz, 2012).

Teece (2010) or Baden-Fuller and Mangematin (2013) interpret business models as 'sets of cognitive configurations that can be manipulated in the minds of managers'. Business model innovation requires strategic agility and entrepreneurial actions on the part of decision-makers (Sosna, Trevinyo-Rodriguez and Velamuri, 2010). A major managerial challenge is to counteract or at least alleviate the inhibiting impact of established dominant business logic and historically grown path-dependency in innovation decisions into new value proposition opportunities (Sydow, Schreyögg and Koch, 2009). Cognitive ambidexterity, e.g. the combination of analytic logic and affectively charged intuitive pattern recognition in strategic decision processes of leadership managers, fosters firm-level entrepreneurial behaviour (O´Reilly and Tushman, 2013).

Changes in social technologies can be considered an integral part of business model innovation, defined as adding new activities or changing existing activities in the operations of a business. Therefore, sustainable business model innovation involves the development of new social technologies that advance the sustainability of a firm. Business model innovation allows managers to resolve the apparent trade-off between innovation costs and benefits by addressing how they do business, for example, by involving partners in new value-creating activity systems (Amit and Zott, 2012).

Innovation systems can be considered the broader institutional structures that support technological innovation, including elements such as universities, governmental funding programs and regulations (Nelson and Nelson, 2002). Regulations shouldn´t be formed around short-term political interests, but on long-term societal trajectories for sustainable innovations, which could also support a diverse set of alternate sustainable innovations, increasing sustainable development from the broader view. Business activities further need to collaborate with their stakeholders on sustainability issues, and also with each other to form common norms that support sustainable business model innovation.

Even under conditions of resource scarcity, organizations do not need to renounce innovation as a way of enhancing their performance prospects (Amit and Zott, 2012). An innovative business model can either create a new market or allow a company to create and exploit new opportunities in existing markets. Dell, for example, implemented a customer-driven, build-to-stock model of selling computers through retail stores (Brynjolfsson and Hitt, 2004).

The innovation of business models in established firms can be categorised as a strategic investment of firm resources for future value creation, and the cognitive lens offers the potential to unravel respective processes of managerial thinking which lead to this kind of decision making (Baden-Fuller and Mangematin, 2013). Business models tend to be complex, as they represent boundary-spanning entities which link dimensions of corporate strategy, technological capabilities and innovation processes of the firm (Casadesus-Masanell and Ricart, 2010).

Business model innovation is characterised as an ongoing learning process that relies on discovery and trial-and-error (Smith, Binns and Tushman, 2010). Firms attempting to pursue business model innovations must overcome barriers such as obstruction and confusion among employees (Chesbrough, 2010). Of course, every company must assimilate these models in its own way, to accommodate its own internal culture and external environment (Euchner and Ganguly, 2014). Doing so successfully requires executives to overcome entrenched perspectives and cognitive biases, and it will almost certainly require changing the organizational culture to some extent (Evans and Johnson, 2013).

Slywotzky (2002) outlines 23 distinct business models, including the experience curve, cost leadership, multicomponent profit, and the dynamics that make them work. Business Model Canvas (Osterwalder and Pignneur, 2010), which is based on generation by brainstorming, is often criticised due to missing coherence or the relationship among elements (Euchner and Ganguly, 2014). It consists of nine building blocks: (1) customer segments, (2) value propositions, (3) channels, (4) customer relationships, (5) revenue streams, (6) key resources, (7) key activities, (8) key partnerships, and (9) cost structure. The Business Model Canvas approach can be used to carry out a full SWOT analysis of a company. It can be even used to seek out 'blue oceans', which are new value propositions that aren´t embattled by rivalries (Abraham, 2013).

Business innovation modelling represents a conscious renewal of firm´s core business logic. Teece (2010) emphasises that the reliability of the business model architecture to generate and capture value depends on a deep and comprehensive understanding of customer needs. A company´s business model must be changed if its ability to create, deliver, or capture value declines (Kaplan, 2012).

The business model doesn´t work, if an organization has completed a considerable strategic or organisational change (reengineering, acquisition etc.) For those types of things, strategies and strategic analysis are needed (Abraham, 2013).

3 RESEARCH QUESTIONS AND METHODOLOGY USED

Our research is based on a comprehensive literature review (Boote and Beile, 2005) in the areas of system theory and business model innovation research. By the use of existing contemporary literature reviews we attempted to analyse system approaches that can be best applied to business model innovation drafts.

Because there is not a commonly shared understanding of business model innovation content in the resources reviewed, it was necessary to carry out a critical analysis of the outputs and confront their applicability for the specific purposes of this research.

Research questions raised in the context of this paper are in consonance with the gap earlier disclosed in this paper. Over the past years the business model has been developed by telecommunications companies, but its implementation phase was not addressed at all: (1) is such a business model feasible in this environment? (2) What are the requirements for partial procedural steps of the business model? (3) Are formulated procedural steps valid and relevant for both parties concerned (mobile operators and virtual mobile operators)?

Ethnographic research became due to the need of doing contextual interviews convenient methodological tool (Dey, 2002). Contextual interviews were applied to the group of company managers and specialists who were actively involved in the design of a new business model. As methods used for the evaluation of results, scientific observation and comparison took preference over others. The comparison method was used for comparing price levels of telecommunication services within OECD countries while the explanation was used for the characterization of virtual operators. This method of modelling was applied to corporate process design and functions.
The practical aspects of the research were explored in the rapidly changing telecommunication business, which after years of decent oligopoly competition faces upcoming distribution of new frequencies as well as entering new virtual operators.

4 SPECIFICATION OF A VIRTUAL OPERATOR

The fundamental difference that distinguishes standard and virtual operators is their access to infrastructure. A virtual operator operates as a provider of telecommunication services to end users without either the possession of full infrastructure or the licence for using radio frequencies.
Such an operator usually declares its corporate identity through its own brand. A virtual operator is marked by the abbreviation MVNO (*Mobile Virtual Network Operator*). Due to existence of various types of virtual operators, their definition is often excessively general. As an example, the British telecommunication market regulator defines a virtual operator as *'The organization which offers telecommunication services to customers without possession of broadcasting time'* (Ofcom, 2004, p. 17). According to the International Telecommunication Union (ITU) definition: *'Mobile virtual operator is an operator which offers telecommunication services, but it doesn't licence for radio frequencies. Usually it assigned an identification number, by which it logs in into network and in*

many cases it issue as SIM card (ITU, 2011)'. The first Czech virtual operator BLESKmobile further extended the definition of ITU by factors of marketing, distribution and customer support (RAS, 2012, p. 5).

4.1 Virtual operator models

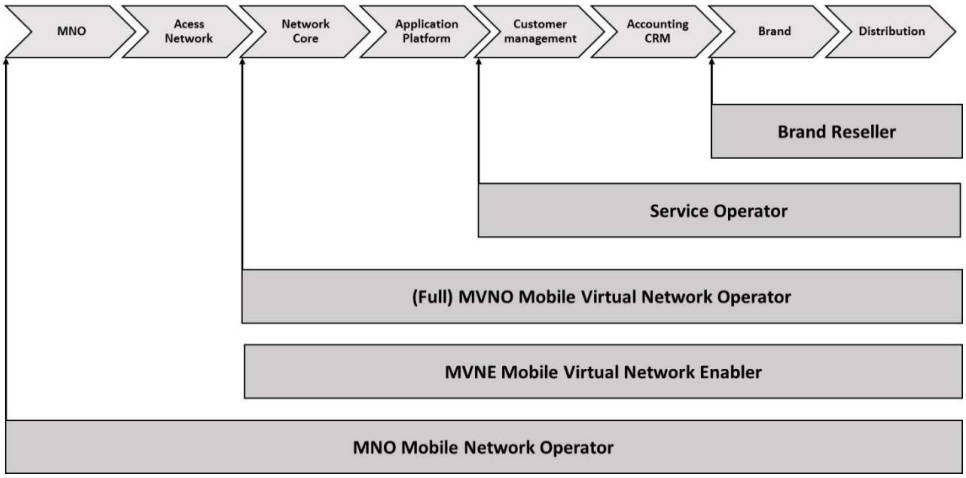
The term MVNO *(Mobile Virtual Network Operator)* is ambiguous. It contains more attitudes to functions, strategy and technical solution. The main models of MVNO are characterized as branded reseller, service operator and full MVNO, which are mostly contractually bound to a traditional network operator MNO *(Mobile Network Operator).* Typically three possible models of mutual relationships among MNO, MVNE and MVNO are described (Špaček and Štěpán, 2013). In the traditional model, is the only provider MNO. In the MVNO model, is the infrastructure hired and services are offered to customers under its own brand. MVNE *(Mobile Virtual Network Enabler),* hires technical solutions, which are afterwards leased to MVNO. The general trend seems to be an evolution towards an MVNO with ownership of the entire core network architecture and where MNO is buying access to it (Balon and Liau, 2012).

4.2 Virtual operator value chain

Fig. 1 describes in detail the value chain of individual types of virtual operators. This value chain breaks down provider operations into individual processes. From the point of view of strategy, one must clearly define the processes that are sources of competitive edge. The only viable model of virtual operator is that which brings competitive advantage and is able to successfully compete on a telecommunication market which is becoming more competitive than ever.

The MVNO *(Mobile Virtual Network Operator)* potential to reach success was tested against a business environment structure (Shin, 2008) and revealed that the business environment structure can significantly influence the position of MNVO. In case that MNO *(Mobile Network Operator)* is vertically integrated, this operator is then able to charge monopoly prices and thus the ability of MNVO to offer services is constrained.

From this point of view a horizontally layered structure seems to be more inviting for MVNO. For this reason, MVNOs which operate in West European markets are far more successful to be compared with competitors acting in Asia. Applied pricing policy is to a large extent influenced by both the level of oligopoly strength of the MNO (Le Cadre and Bouhtou, 2012) and the behaviour of other MVNOs (Zhao, Zhu and Zhu, 2012).



Adapted according: NSN (2004, p. 4)

Figure 1 - Types of mobile operators

A **Brand reseller** aims to provide customers with services and building their own brand. A branded reseller doesn't own any infrastructure; it hires a comprehensive technical solution from either an MNO or other virtual operator. Branded resellers manage the image of their own brand and distribution channels as well. Notwithstanding a brand reseller's direct contact to end users, all data on customers and accounting administration is arranged for by their business partner.

Such a partner is directly bound by contract to the brand reseller's customers. The brand reseller's profit margin is derived from the difference between the wholesale price of a one minute call, which is paid to the host MNO, and the retail price which is settled by the end user. The nature of saving costs for the brand reseller is accomplished by using the same distribution network as the parent company.

BLESKmobil uses identical distribution channels such as newspaper stands both for pre-paid cards and the Blesk tabloid. Since a brand reseller need not build either its own network or infrastructure, this business model is least demanding for capital expenditure. A brand reseller can approach even a small segment of end users that are then consolidated into clusters with certain specific characteristics such as operating on the same premises or having similar or very similar needs. As an example, he may set an offer of special tariffs for students. Brand resellers are only restrained in capability to innovate their own services to those provided by the infrastructure operator. The space for price adjustment is limited (Špaček and Štěpán, 2013).

The **service operator** ranks between the brand reseller and full MVNO. This model offers more flexibility than the brand reseller model, especially in terms of managing customer relationships, pricing strategy, and amount and structure of

the services offered. Service operator models are, from a technical point of view, more complicated, because service operators operate their own IT system. Compatibility of both IT systems is an underlying factor for optimum collaboration with a MNO.

Due to the interconnection of both IT systems there is an increased dependence by a service operator on its host MNO. The service operator model enables price competition with the host MNO since the service operator is allowed to actively manage customer relationships (CRM) as well as influence price strategy. In this way a competition between the virtual and host operator may come into effect, especially in segments with high profit margins (premium segment).

The MNO often regards service operators as competitors and is sometimes not willing to lease infrastructure to them. A possible solution to this problem is either signing an agreement, where the host reserves conditions which are favourable to him or taking only market positions that create synergic effects.

The full **MVNO** (Mobile Virtual Network Operator) includes ownership and operation of the complete infrastructure except its Business Support system *(BSS).* A full MVNO issues its own SIM card with unique IMSI identification and a specific phone number with its own dialling code. Call termination fees[2] are charged as a liability of the full MVNO. The full MVNO hires the base stations system only.

As opposed to previous types of virtual operators, the advantages of full MVNO consist in the interconnection of calls, better flexibility with respect to the MNO and innovation opportunities. A full MVNO, as distinguished from service operators and brand resellers, is relatively independent of the host. If the full MVNO decides to change the host MNO, there is neither a need to change end user SIM cards nor to change the settings of the IT solution. A full MVNO can also offer all the services a MNO does. The only limiting element is the quality of the host MNO network (2G, 3G or 4G system). When a higher quality BSS is desired then it becomes necessary to change the host. In general, the larger part of its own infrastructure the operator controls the higher possibilities for virtual operators to exist (Špaček and Štěpán, 2013).

The **MVNE** (Mobile Virtual Network Enabler) model differs significantly from the aforementioned models. This type of virtual operator has no direct contact with the end user. Its core business resides in services mediation to other virtual operators. As a matter of practice, MVNE uses the system of base stations (BTS and BSC systems) of the MNO operator. Additional systems like NSS *(Network System Security)* and OSS (operational support system) are in possession of MVNE. Applicants who want to operate MVNO can use the structure that MVNE already owns and leases. MVNE then arranges for client access to other networks, establishes a virtual switchboard and connects the call with that person to be called.

[2] It means rates which mobile operators charge to each other.

A typical example of MVNE in the Czech Republic is the Telematika Company which collaborates with O2 and thus it achieves complete Czech Republic region coverage.

4.3 Criteria of Mobile Virtual Network Operator (MNVO) choices

First of all, one must choose an appropriate type of MVNO. This represents a complex multi-criteria decision making process. When choosing a proper set of criteria it is inevitable to observe all those aspects that contribute to competitive advantage as well as those that represent key risk factors.

First of all, the **time factor** is worth mentioning, since current market demand for cheaper operators will be continuously compensated for an increasing number of new virtual operators entering the telecommunication market. Another risk factor that may hamper successful MVNO establishment is **initial investment costs**. Providing that the project didn't work out, it would be difficult to sell partially worn out technical equipment.

But ownership results in the increase of **profit margins,** which accounts for another possibility. As a matter of fact, the establishment of MVNO would always be backed by a **feasible legislative process** which may vary by the model chosen. At the end, a company needs effective process management to be purposefully established. The number of employees, organizational structure and other aspects of company management are crucial to company success. The **skills of company management** should thus be considered as a criterion.

5 PROPOSAL OF A NORMATIVE BUSINESS MODEL INNOVATION AIMED AT ESTABLISHING A VIRTUAL OPERATOR[3]

Even if the approach to establishing a virtual operator may differ slightly from case to case, it is possible to generalize findings from the current practice of existing and potential virtual operators. Thus a set of recommendable steps for a normative business model innovation draft can be made to establish a competitive virtual operator. This model has been further refined. The setting up consists of the following steps.

5.1 Macro and microeconomic analysis

The analysis performed by the authors proved the priority of information, which is necessary for managerial decision about further development of the virtual operator establishment project. Ascertained opportunities and threats are the risk

[3] The chapter comes out of the normative model addressed by Špaček and Štěpán (2013) which was broadened, refined and tested in the sense of research questions set forth in this text.

factors which are analysed whether an environment is suitable for the establishment of a virtual operator.

5.2 Internal company analysis

Analysis of internal company´s environment confirms strengths and weaknesses, that determine the unique assets or competences a company has and whether it is possible to offer them to a Mobile Network Operator (MNO) in partnership. Such an approach identifies potential synergic effects from which both companies will benefit. The outcome of this analysis is always a set of tangible or intangible assets which may be the source of competitive advantage.

5.3 Strategic goals determination

Strategic goals are determined in agreement with the well-known SMARTER principle (Fotr, et al., 2012). Long-term strategic goals at the corporate level should be reduced to partial goals tied to individual processes. For the effective implementation a set of short-term goals must be derived from long-term goals. The implementation process can be supported by special methodology, such as *Balanced Scorecard*.

5.4 Process organizational structure determination

The main goal of the process organizational structure determination is to find such process architecture, where each process contributes to company value creation. Key company processes are marketing, new customer recruitment, service delivery and customer support. Each of these processes is assigned a process 'owner' responsible for complete management including goal settings, incorporation of permanent improvement principles and sources allocation. The outcome is a proposal of company process structure to be visualized by a company process map.

5.5 Elaboration of a marketing plan

The important aspect of a marketing plan is market segmentation. It is evident that a Mobile Virtual Network Operator (MVNO) most effectively operates when customers are satisfied within particular segments. Research done in the Czech Republic ascertained that there are dissatisfied customer segments in the Czech telecommunication market (Špaček and Štěpán, 2013). The marketing plan is based on the '4P principle' (product, price, placement, promotion). That is extended by an additional '3P' in the service sector (people, processes, physical evidence). 4P is then collated with 4C one (customer value, customer costs, communication, convenience) so that the customers´ standpoint is properly reflected.

5.6 Choice of Mobile Virtual Network Operator (MVNO) type according to criteria

The process of choosing an MVNO type is subject to meeting already specified criteria, the objective being to find a model that best fits predefined criteria. The set of predefined criteria posted in this paper arose from the research and mirrors the most important operator preferences. They may still adapt to fit a particular situation. Criteria evaluation process adheres to the commonplace principles of managerial decision making (Fotr, 2006).

5.7 Corporate strategy elaboration

Investors shall make investment decisions that confirm the economic effectiveness of the project as well as financial decisions based on the financial viability of the project. This means an investor must be assured that for each year of the project he will receive such a combination. The point which must remain in focus is human resources management.

The corporate strategy reflects customer preferences, market and segment situation and competitors activities. Based on key company competences the strategy have to preserve flexibility simultaneously with focus on low cost competitiveness.

5.8 Critical success factors (CSF) determination

While discussing virtual operator expertise, the following four critical success factors were determined: (1) negotiation with Mobile Network Operator (MNO) and coming to terms, (2) reliable function of a network, (3) web application quality, and (4) cost overruns, shortage of cash flow.

Negotiation with MNO

Suggestive and persuasive presentation of the proposal to the MNO is a keystone of project success. Composition of a team to be in charge of negotiation must be both representative (CEO and Corporate Heads) and professionally highly qualified (telecommunication experts). The project must be clearly defined and its layout must be at highly illustrative and understandable. The synergic effects and benefits for both parties must be effectively highlighted. The concept must properly address the type of Mobile Virtual Network Operator (MVNO), as well as outcomes of previous analyses, technical solutions to the project, tangible and intangible assets to be invested, securing financial sources, proving economic effectiveness and commercial viability supported by guarantees to investors. Remember thorough risk analysis and the set of provisions for their mitigation.

On the other side the MNO must indicate if the proposal is worth further discussion. Both parties should play win-win game. If the project seems profitable for both parties it is inevitable to proceed with negotiation on further agreement. It is tedious work and both party lawyers must play their roles.

Notification to Czech Telecommunication

Depending on the model chosen some obligations to the MNO may occur. The scope and nature of these obligations should be properly addressed in PESTEL analysis. This basically deals with the compliance with the Law No. 127/2005, which sets up conditions for communication activities execution. This legal norm is applicable to all sorts of networks and electronic communication services.

6 DISCUSSION AND FINDINGS

Business model innovation is considered one of the vehicles that drive prosperity. Operating a functional Business model is widely understood to be superior to having a good and technically perfect product. Considering the establishment of a new business model is relevant in situations where obsolete business models no longer reflect customer needs.

Such a situation came into existence over the past several years where the oligopoly telecommunication market was unable to satisfy customer needs in terms of providing high quality service at affordable prices. For this reason Czech government enabled a relaxation of the Czech telecommunication market to enable so called 'virtual operators' to enter the Czech telecommunication market.

Mobile Virtual Network Operator offers a new business model that brings added value to both providers and end-users. This business model is spreading across the world and includes more approaches to operation, strategy and technical solution. The launch of virtual operators is supposed to come into existence in the Czech Republic in near future.

Even the first 'early bird' BLESKmobil has already noticed. The virtual operator business model brings new benefits like lower demands for capital expenditure. Prior to formulation of a normative model, thorough analyses of macro and micro environments were performed so that the suitability of the Czech telecommunication market for a new virtual operator establishment would be properly judged. As measured by the *Herfindahl–Hirschman Index (HHI)* it was found that Czech telecommunication market had an oligopoly character. The three existing rivals don't exert sufficient competitive pressure which would level prices to the European market.

The normative model presented in this paper was built up step by step based on fundamental information from internal and external environment. Then process organizational structure was defined, goals were determined, marketing plan was formulated. After that it was posible to set criteria for the Mobile Virtual Network Operator (MVNO) type negotiation. Finally corporate strategy was confirmed and critical success factors were set.

The key finding was that, notwithstanding reinforcing competitive pressure caused by newcomers, the Czech telecommunication market is still very

promising and profitable for newcomers (see Tab. 1). The paper sought answers to three research questions. The answers follow: (1) the presented business model is feasible in the environment of the virtual mobile operator. This finding was approved by the managers and specialists of the virtual mobile operator BLESKmobile after having tested the model on selected data. (2) Partial procedural steps of the model were presented in the paper (see Chapter 5).

The requirements for the procedural steps were derived from both the literature reviews and contextual interview with virtual mobile operator managers and specialists. These requirements include corporate strategy, macro and micro environment analysis, thorough internal company analysis including core competences, resources review and company intangible assessment such as human capital, organization and information base. Specific regulatory requirements must be taken into account as well.

Based on this requirement the critical success factors of the implementation of mobile virtual operator were determined (see Chapter 5.8). (3) Formulated procedural steps are valid because data exists for each proposed procedure. The model is complex and flexible because it is possible to make corrections in real time upon the finding of fundamental changes in the environment. It reflects the actual strategy of mobile operators and that´s why it can be taken as relevant for the establishment for the new virtual mobile operators.

7 CONCLUSION

The paper deals with the determination of business innovation model possibilities by creating sustainable competitive advantage in the branch of contemporary information and communication technologies. The business model innovation design is always closely connected with the business strategy of the firm.

Some authors like Porter are convinced that firm´s strategy is on a higher level than business model innovation and it represents the only way to achieve superior profitability of the firm. As to be directed into future, both strategy and business model innovation must mitigate a number of risks. But on the other side, risk factors may also present an opportunity for starting new businesses and safeguarding them by competitive advantage. From this point of view firm´s strategy and business innovation model must be in consonance.

The success rate of created business model innovation can be multiplied by rationally set regulation criteria, which in the long-term leads to sustainability of the system. The business model innovation is specific for each branch and company and underlies actual changes in the environment.

This paper presents the structured normative model of virtual operator foundation which hasn´t yet been solved and would be almost generally applicable by any potential newcomer to the budding virtual telecommunication market. The research verified feasibility of this model that responds to the demand of virtual telecommunication operators. The normative model was primarily designed on a

theoretical base that was confirmed by the opinions of virtual mobile operator managers and specialists. Further validation of this model in practice is the future challenge for the applied research.

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Crowdfunding – The Case of Slovakia and the Czech Republic

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ABSTRACT

Purpose: Crowdfunding as a form of alternative financing has become a widespread and successful form of financing new ideas. In this paper, we investigate crowdfunding in CEE countries, Slovakia and Czech Republic, with a strong focus on reward-based crowdfunding. The aim of this paper is to describe the current situation of crowdfunding in the Czech and Slovak Republic.

Methodology/Approach: We have analysed the Czech and Slovak market and compared it to the global platform Kickstarter in an attempt to find variables affecting the success of projects using linear and logistic regression.

Findings: The distribution of types of crowdfunding is similar to the global situation, but the low levels of awareness and conservatism are slowing down the speed of development of crowdfunding in Slovakia and the Czech Republic. We have also observed a higher degree of uncertainty and randomness in modelling of crowdfunding.

Research Limitation/implication: In this paper, not all crowdfunding portals have been included because of data unavailability.

Originality/Value of paper: The originality of this paper is guaranteed by its focus on the crowdfunding industry in the Czech and Slovak Republic.

Category: Research paper

Keywords: crowdfunding; reward-based; start-up; entrepreneurship; innovation

1 INTRODUCTION

Crowdfunding became a financial phenomenon only a few years ago, but in a broader sense it has a long history. The main idea, collecting money from a crowd, is a form of charity used for centuries. Using crowdfunding as microfinancing dates back to the 18th century, when Jonathan Swift started to give loans to low-income families. Other authors attribute the origin of crowdfunding to the subscription business model, where books were written and printed only in case of sufficient demand. All these ways of financing can be identified as forerunners of crowdfunding (Ordanini, et al., 2011).

We can talk about modern crowdfunding since the 20th century, when more individual projects were started with signs of crowdfunding. The emergence of new technologies and other aspects known as Globalization 3.0, significantly simplified the adoption of innovative financing (Szabo, Šoltés and Herman, 2013). According to Petrov (2015), the first successful crowdfunding project was created in 2003 by a web platform, ArtistShare. According to Statista (2016), the number of US crowdfunding platforms has risen six times during the period 2007-2011. Moreover, the crowdfunding volume has multiplied during this period. According to Massolution (2015), the worldwide crowdfunding volume doubled in 2015, accounting for $34.4 billion and it is going to exceed venture capital volume. Figure 1 shows the development of crowdfunding volume, where we can observe an exponential growth. It is worth mentioning the support provided by the government in USA and also in the most developed countries of the European Union by creating a legal framework and using financial injection in the last years.

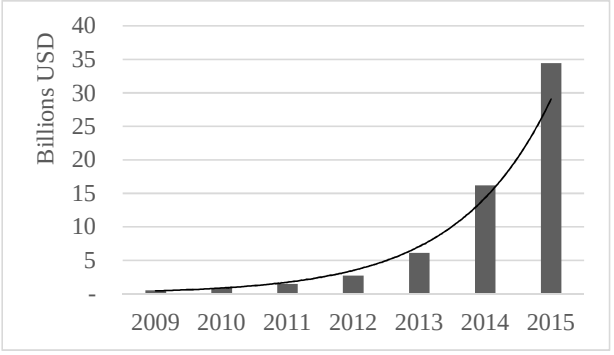

Figure 1 – Development of total crowdfunding volume in World
Source: Massolution (2015)

Currently, there is a great development of innovative ideas. These ideas are the fruits of hard work of people, and obtaining money is usually a major challenge. Because of the risk, banks are not a good option for raising money, and therefore it is neccessary to find other alternative ways. Choosing a way of financing depends on the life cycle of the enterprise (Kádárová, Bajus and Rajnoha, 2015).

Crowdfunding is one of the solutions to raise capital to support new projects or to set up a business. Compared to other financing alternatives, it offers various advantages and disadvantages, that may affect the choice of a financing method (Hudec, 2015; Mura and Buleca, 2012). Crowdfunding belongs to the group of alternative financing of a business, together with private equity or venture capital. Venture capital has a similar target group by supporting projects and companies in an early stage and with a high degree of risk. Venture capital is typical for interventions of investors in the management of the project. These interventions are consequences of the investor's effort to reduce project risk and to help it succeed by providing valuable information such as know-how and arranging contacts (Šoltés, V. and Šoltés, M., 2013).

2 LITERATURE REVIEW

First of all, we have to define the term crowdfunding. According to Schwienbacher and Larralde (2010), crowdfunding is "*an open call, essentially through the Internet, for the provision of financial resources either in form of donation or in exchange for some form of reward and/or voting rights in order to support initiatives for specific purposes*". Small contribution, a large number of contributors and the Internet are essential elements in the definition of crowdfunding. Small contributions are a sign of microfinance and crowd participation is the result of crowdsourcing (Mollick, 2013).

Crowdsourcing is the process of providing resources by a large number of people to carry out a specific role in product development. Using similar ideas included in this definitions, we can create a simple explanation of crowdfunding. It is a form of raising capital from a high number of individuals, to support startups or projects. Crowdfunding represents a new way of funding projects and enterprises, where a small contribution is provided from a high number of individuals almost exclusively via the Internet (Burtch, Ghose and Wattal, 2012). For a precise definition of the term it is necessary to emphasize the process of obtaining funds through the Internet platform, which is highlighted by Burtch, Ghose and Wattal (2012). Internet is seen as a tool for communication and campaign conduction. WEB 2.0 represents an important role in this definition. However, we can encounter the term Web 3.0, but as a new term it is not clear what it includes exactly (Bánciová and Raisová, 2012).

Portals bring together people looking to invest and people looking for investments. To protect the personal information of contributors and project developers, portals are used as a gateway and publish only necessary data. Donors may remain anonymous, but authors have to introduce themselves. According to Zheng, et al. (2014), contributors, applicants and portals are the basic types of actors connected by a crowdfunding portal. In a crowdfunding campaign, social networks are important and help to achieve a funding goal. Zheng, et al. (2014) have analyzed other dimensions of social capital, obligations and shared meaning, with positive effects on crowdfunding. Because of the

specific development of China, they have found a stronger relation in China than in the USA.

According to Belleflamme, Lambert and Schwienbacher (2014), we can distinguish between four types of financing differing in forms of recompense, i.e. rewards-based, donor-based, equity-based and debt-based model. Crowdfunding platforms often focus on one type, but that does not exclude the offering of different crowdfunding types.

The first model, as the name suggests, takes the form of donations. Individual investors expect no reward for their contributions and so they can be described as philanthropists. This form is characteristic for cultural and social projects created mainly by non-profit and charitable organizations. Charity has a long history in Slovakia and it has been developing since 2007 in CEE countries (Belleflamme, Lambert and Schwienbacher, 2014).

The debt model represents the equivalent of borrowing. Contributors expect a certain amount of interest usually higher than in banks. A certain analogy is seen in P2P lending that meets several characteristics of crowdfunding. P2P lending is sometimes subdivided, but according to Massolution (2015), we will consider it a part of crowdfunding.

Equity crowdfunding is a little bit different, because it uses smaller numbers of investors and the fundig goals are much higher than in other types. Contributors usually gain a minor equity share in the business. Due to this fact, legalization and regulation were needed. It was performed through the Jumpstart Our Business Startups Act in the USA and via a directive Alternative Investment Fund Managers Directive in Europe. This directive has not created a fully integrated framework for equity crowdfunding throughout the European Union (Lasrado and Lugmayr, 2014).

The reward-based model is currently very popular around the world. Authors of the campaign get funds for their projects in exchange for a different reward, especially in the form of discounts on their products. This can be understood as a form of product pre-orders. Sponsors usually receive products earlier, but usually for a higher price than the final selling price. The smallest contributions get only small rewards, higher contributions are rewarded by more interesting products. (Belleflamme, Lambert and Schwienbacher, 2014)

The second subdivision represents projects with fixed or flexible funding. Projects with a fixed funding are the most common and also known as “all or nothing”. The project is funded only if the funding goal is achieved. Pledges below the target amount mean failure of project and they are returned to the contributors. Flexible projects receive the amount collected, regardless of how much money was collected. Flexible projects are governed by the motto "keep it all" and they are used in donor-based models, but also in reward-based campaigns (Stroková and Bieliková, 2014).

Fundraising is possible only during a campaign. A crowdfunding campaign usually lasts from 4 to 6 weeks, depending on portal policy or author selection. During this campaign the goal is to raise more money than the funding goal. At the beginning of a campaign, family and friends are the main sources of the collected money, but later the breaking point occurs and the project becomes viral (Belleflamme, Lambert and Schwienbacher, 2014).

Crowdfunding is a demand-oriented way of financing. The success of the campaign is the result of sufficient demand. Feedback is represented by comments and authors can use it for improving their ideas. Crowdfunding allows support to atypical projects with low chances of borrowing money from banks. Moreover, an unsuccessful campaign means that authors do not have to pay any fees. Pebble smart watch is an example of a successful crowdfunding campaign, in which, despite an unsuccessful venture capital financing, the funding goal was exceeded by 100-times (Mollick, 2013). On the other hand, projects are presented publicly, so the main idea of a project can be easily duplicated. The other negative aspect are the fees for a project. Usually, it is a certain percentage from the fundraised amount. To the negative aspects we can include the opportunity costs that are associated with venture capital, including contacts and know-how (Zheng et al., 2014).

3 CROWDFUNDING IN SLOVAKIA AND THE CZECH REPUBLIC

Slovakia and the Czech Republic are very similar countries with a shared history. They represent developing countries of the European Union with economies linked with each other. They have acted as independent countries since 1993, but a number of similar elements remained during their disaffiliation, for example similar constitution and laws. There is almost no language barrier, no law barrier, free movement of goods, capital, services, and people and therefore companies often act on both markets. Crowdfunding can be a good example of cooperation, since many portals operate in both Slovakia and the Czech Republic. Because of the interconnections of these countries we have decided to analyze the crowdfunding market for both countries.

Despite the small size of Slovakia and the Czech Republic, the crowdfunding market is growing very fast. Crowdfunding does not have direct regulation in these countries, but on the other hand legislation has general rules and restrictions for collecting funds from the public and their use, rules for the protection of consumers and prevention of money laundering. Regulation is performed by the following acts: Payment System Act, Banking Act, Consumer Protection Act, Civil Code, on Public Collections and Lotteries (Husták, 2015). The Czech Republic has also Act on Collective Investment and Act on Securities and Investment Services, in Slovakia there is the Act on Collective Investment. The recent amendment of these acts brought the legalization and regulation of all types of crowdfunding.

In the case of Slovakia, crowdfunding occurred in 2007 already, in the form of a donor crowdfunding portal. Donor crowdfunding has the greatest experience in Slovakia, in the Czech Republic it is not so wide-spread and the first donor crowdfunding platform was founded only in 2016, but on the other hand other forms of charity have a long history. The Czech Republic has a more developed reward crowdfunding market. Reward-based projects have been provided by HitHit since 2011. In 2014, the biggest Czech reward crowdfunding portal HitHit entered the Slovak market. Since then, more portals have been created in Slovakia, but some of them have been already cancelled. The same situation can be observed on the Czech market. As an example, we mention four cancelled portals: Kreativcisobe.cz, Fondomat.cz, Ideasstarter.com and Odstartovano.cz. Equity crowdfunding has the smallest proportion with only 3 successful projects in Slovakia. This form is provided only by portal Crowdberry in Slovakia and the Czech Republic, but another platform Fundlift is entering the Czech market. Lending crowdfunding represented by P2P lending is becoming quite popular. According to Massolution (2015), lending crowdfunding accounts for 72.99% of contributions in the world. In these countires, it is not so wide-spread and the first investments occurred in 2012.

3.1 Methodology

According to a number of journals in Web of Science, crowdfunding has become interesting for academics since 2012 and the number of papers is growing exponentially. The Slovak and Czech crowdfunding market is underdeveloped. In this paper, we provide an analysis of the market by investigating portals currently operating in these countries. After the market analysis, we discuss the reward crowdfunding model industry. We have found 18 operating portals on the Slovak and Czech market, but only 15 portals offered accessible data for analysis.

In this paper, we try to answer the following questions:

- What is the most wide-spread type of crowdfunding in the Czech and Slovak Republic?
- Are crowdfunding projects similar compared to the worldwide crowdfunding platform Kickstarter?
- Are there any patterns in crowdfunding campaigns?
- Are there any variables predicting the success of a project? Is their influence similar compared to other studies?

In the second part, we have collected 1036 reward crowdfunding projects from the Slovak and Czech portals. Data were unified for further analysis. It was necessary to solve the problem with different currencies. The Czech crown was converted to Euro using the current exchange rate 27.03 CZK/EUR. Country assignment was not always available, but we have identified 66 Slovak and 713 Czech reward crowdfunding projects using the location of the project. 257 projects have not mentioned their location, or these projects were connected with

other countries. For example, a planned expedition to Nepal had realization place Nepal, but it was realized by Czech authors. We have collected data from four portals: HitHit, Katalyzator, Marmelada and Startlab, because of unavailability of failed projects on other portals. HitHit platform is the most-represented portal with 92.13% of all Czechoslovak projects. Other sites included in the analysis were the Slovak sites Katalyzator, Marmelada and Startlab. The collected data are from the period November 2012 to January 2016 excluding ongoing campaigns. The number of projects ending in January was relatively small and this month was also excluded from the sample. Duration was a useless variable because of the fixed length of projects. In order to preserve the accuracy of the analysis, all projects with the "keep it all" idea were excluded too.

3.2 Overview of Crowdfunding in Slovakia and the Czech Republic

For a few years, crowdfunding in Slovakia and the Czech Republic collected €10,592,844. This sum was obtained by analyzing 15 portals. We have found few portals, that have already been cancelled, and therefore they were not analysed. Data from three other portals, two lending and one equity portal, were not available and so, they were excluded from the analysis too.

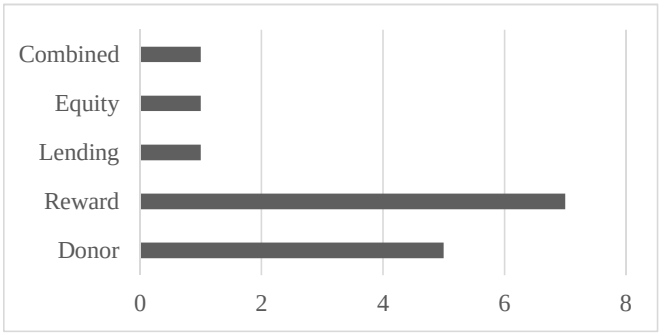

Figure 2 – Number of Czech and Slovak portals by category in 2016

A detailed crowdfunding analysis is presented in Fig.1 and Fig. 2. Fig. 1 shows the frequency of crowdfunding types in Czech and Slovak portals and Fig. 2 shows the amount of money collected on these portals. Data from two lending portals and from one equity portal were not available and therefore we did not include it in our exploration. Reward-based portals are the most numerous, but charity projects are available in other forms.

Donor crowdfunding P2P lending has the highest proportion of the collected amount, however, its proportion is only 37.09% in the Czech Republic and Slovakia compared to 74.99% globally. The reason is mainly unavailable data for two portals Pujcmefirme.cz and Zinc Euro. Donor crowdfunding plays also an important role with 29.78% of market share, but 99.56% of pledges were from Slovak portals. Although, most sites provide reward crowdfunding, reward-based volume ranked only third place accounting for 24.88% of all pledges. Equity

projects are relatively new for both markets and so their representation is very low. We have to mention that three successful projects collected EUR875,000, reaching 8.26% of market share. The last type was the combined model of reward and donor model, represented by platform Penězdroj. This portal is not as popular as others and recorded only very low turnover, EUR38,050 in total.

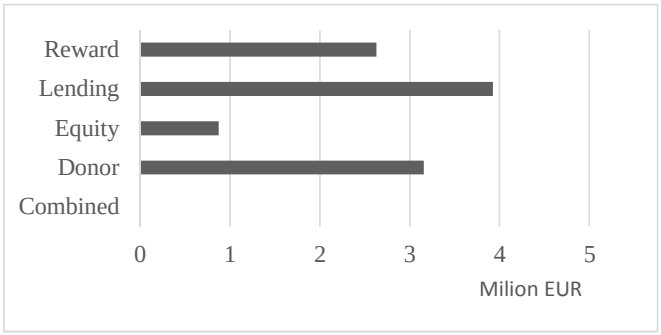

Figure 3 – Collected contributions of successful crowdfunding projects

3.3 Comparing reward crowdfunding

The most successful Czechoslovak crowdfunding portal is HitHit. Its biggest competitor Startovac.cz, however, does not disclose failed projects. Therefore, we included data only from four portals.

Table 1 – Reward-based crowdfunding portals in the Czech and Slovak Republic

Portal	Origin	Particularities
HitHit (Slovakia, Czech Republic)	2012 in CZ, 2014 in SK	Provision max 9% and bank fees 1.5-2.5%; Fixed Duration of campaign, 45 days
Katalyzator (Czech Republic)	2014	Provision 9%; Authors can set campaign duration (30,45,60 days)
Marmelada (Slovakia)	2015	Provision 8% and bank fees 1.59% +0.1€ from every contribution
Startlab (Slovakia)	2015	Provision 6%; „All or nothing“ and „Keep it all campaigns“,
Nakopni.me (Czech Republic)	2011	Provision 3%
Startovac.cz (Slovakia, Czech Republic)	2013	Provision 5–9%
Everfund (Czech Republic)	2013	Provision 8% + bank fees 1.4%-2.1% + 1CZK from every contribution
Penezdroj (Czech Republic)	2015	Combination of donor, reward and equity model; Provision Reward 7%, Dontaion 3% and Equity 7%

Table 2 provides information about the success ratio of the projects in the analysed portals in comparison with Kickstarter. Data from Kickstarter were not

used for total and average values. Kickstarter is not included in Total/Average values in any table.

Table 2 – Statistics of project success for the analysed portals

Portal	Successful projects	Failed projects	Projects total	Success ratio
Kickstarter	*106161*	*194350*	*300511*	*35.97%*
Hithit	409	516	925	44.22%
Katalyzator	22	14	36	61.11%
Marmelada	8	17	25	32.00%
Startlab	14	4	18	77.78%
Total /Average	453	551	1004	45.12%

Comparing Kickstarter and the Slovak and Czech portals revealed a higher success ratio in the Czech and Slovak Republic. One of the possible answers is the low level of projects in these countries. Riskier projects are placed on worldwide sites like Kickstarter and Indiegogo to improve chances of success. We have found 20 Slovak and 122 Czech projects on Kickstarter's site and 38 Slovak and 76 Czech projects on Indiegogo. Startlab showed an above-average success ratio, but the reason was the availability of "keep it all" campaigns, allowing success of a campaign even though the goal has been not achieved.

Table 3 – Statistics of collected amount for analysed portals

Portal	Successful projects	Unsuccessful projects	Collected total	Average Contribution	Average Percentage funded
Kickstarter	*2.116 bn $*	*0.282 bn $*	*2 398 bn $*	*81.82 $*	*105%**
Hithit	1 608 770 €	191 712 €	1 800 482 €	30.02 €	114.74%
Katalyzator	70 058 €	6 728 €	76 787 €	39.85 €	119.18%
Marmelada	16 279 €	5 272 €	21 551 €	30.89 €	104.89%
Startlab	62 671 €	1 271 €	63 942 €	28.47 €	112.54%
Total /Average	1 757 778 €	204 983 €	1 962 762 €	30.26 €	114.73%

**According to Zheng and Li*

Comparing Kickstarter with the Slovak and Czech Crowdfunding Industry revealed that Slovak and Czech average contributions are much lower than the international ones. The average pledge on one person is $81.82 considering only Kickstarter in USA, but only €30.26 in the Slovak and Czech market. This is confirmed by the Massolution report (2015), which claims that the European Crowdfunding Industry is developed only in the most advanced countries in the European Union, mainly United Kingdom and Germany.

3.4 Distributions

We have used histograms to compare the crowdfunding market in Slovakia and the Czech Republic. We can see differences between these markets, because the Czech reward crowdfunding market is more developed, but we have to

emphasise the progress of the Slovak donor crowdfunding market. Our dataset contained 59 Slovak projects and 689 Czech projects. The remaining projects did not contain location information. We used public data about Kickstarter projects from CrowdBerkeley database (CrowdBerkeley, 2016).

By comparing campaign goals, we have found that the data samples do not come from the same distributions. To confirm this assumption, we have run the Kolmogorovov-Smirnovov test. The same test was used to compare the Czechoslovak market with USA projects. There are significant differences between samples. F-test and Student's t-test showed that the Czech projects have significantly higher average goal and standard deviation. By comparing the whole SK&CZ crowdfunding industry with Kickstarter, we have confirmed again that samples do not come from the same distribution, and so we can draw the conclusion that there are significant differences between the Slovak and Czech market and between the international market too. Crowdfunding still has a long road ahead.

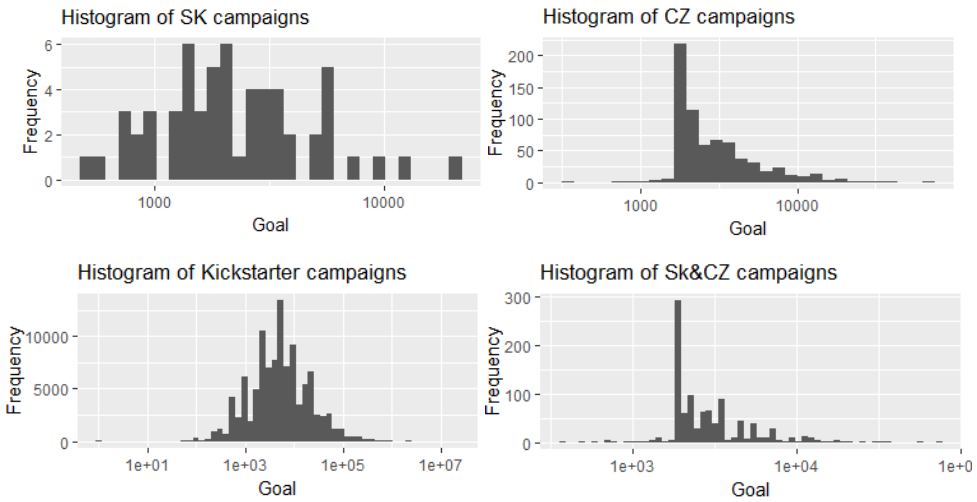

Figure 4 – Histograms of campaigns per data origin

Figure 5 shows distribution of projects according to the obtained ratio of percentage funded. Both distributions act like power laws, using certain bins. We had to limit the ratio of successful projects because of presence of extreme values. 25.22% of unsuccessful projects did not reach 1% of their goal. Only 50% of unsuccessful projects raised over 5.7% of their goal and only 2.5% of unsuccessful projects achieved 50% of their goal. On the other hand, 12.4% of the successful projects did not exceed the percentage funded of 101% and 61.6% did not exceed 110%. 50% of the successful projects reached a lower success ratio, lower than 1.065. Only 2.9% of successful projects scored over double of their goal.

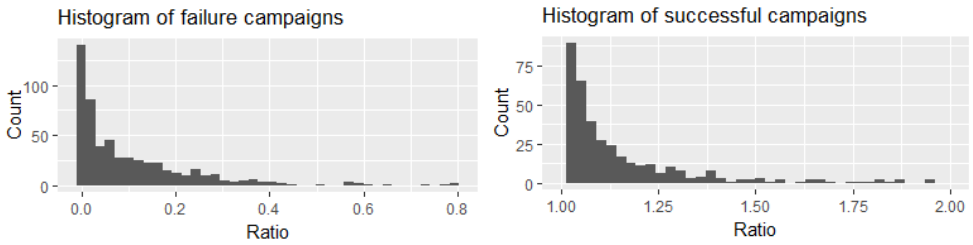

Figure 5 – Histogram of failure and successful campaigns based on ratio of percentage funded

3.5 Data patterns

The most successful project was project "Nakopni Jatka!", for the construction of a multifunctional theatre, reaching 121% of the CZK 2,000,000 goal. Project "SKINNERS - botky do kapsy" achieved the highest ratio funded, reaching 602% of their goal (CZK 542,051). This project brought compact foldable shoe. Successful projects achieved on average 116.24% of their goal. On the other hand, unsuccessful projects achieved only 10.35%. The most common goal was set on CZK50,000, approximately EUR1,850, representing 22.78% of all goals.

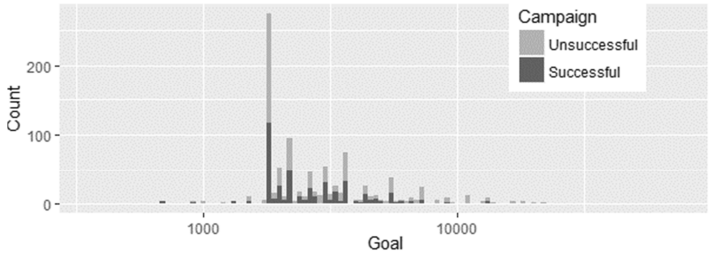

Figure 6 – Histogram of campaigns based on goal using log scale

87.9% of goals are distributed between €1,300 and €7,000. In Figure 7, the development of a number of projects is shown. We can observe some signs of seasonality in crowdfunding. The beginning of the year is characterised by a decrease in project starts and we can observe some other signs in other months too (Štofa and Zoričák, 2016).

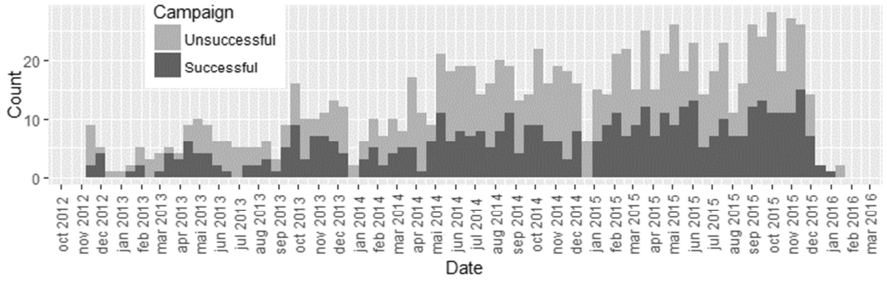

Figure 7 – Frequency of campaigns based on date

3.6 Reward-based crowdfunding models

In order to analyse success factors, we have used the logistic and linear regression. In Table 4, we have the descriptive statistics of the studied data. The average contribution was calculated as donated amount divided by number of donors.

Table 4 – Descriptive statistics of studied variables

	Number of Donors	Donated amount in EUR	Goal in EUR	Success ratio
Average	64.5	1922.7	3745.6	57.76%
Standard deviation	27.0	826.5	2441.0	26.99%
Median	147.9	4102.5	4452.7	58.87%
Minimum	0.0	0.0	370.0	0.00%
Maximum	3692.0	89554.0	73978.0	602.28%

The logistic model showed that only three important variables, i.e. goal, average pledge and number of donors are significant. Our model pointed out that projects with higher average pledge have a better chance for success, but its impact is very low. Furthermore, the number of donors had a positive impact. The most important variable was the logarithmic value of goal. We have found out that projects with higher goals have a lower chance for success. This finding is the same as the conclusions of other authors, hoverer, the impact of goal in this paper is much higher than in other papers. We see the reason for this in the lower willingness to donate to projects with a higher goal in the Czechoslovak market, because of a higher risk. The lower depth of market has an impact too. Other factors such as country, category, month and quarter of campaign start do not represent significant variables. Because country is a dummy variable, being a Slovak project reduces the log odds by 1.9521 compared with undetermined project, while a unit increase in log(goal) reduces the log odds by 7.8608.

Table 5 – Results of logistic regression

Variable	Estimate	Std. Error	Significance levels
(Intercept)	51.155752	6.595193	p<0.001
log(goal)	-7.799092	0.936485	p<0.001
donors	0.146409	0.013826	p<0.001
average contribution	0.082254	0.009955	p<0.001
factor(country)SK	-2.011582	0.883376	p<0.01

The linear model has analyzed the factors influencing ratio pledge to goal. This ratio represents the achieved collected percentage of goal, therefore projects with a ratio higher than or equal to 1 represent successful projects. The most important factor was goal, negatively influencing percentage funded. We found also significant influence of February and June at Alpha level 99%. They both have negative influence on percentage funded in comparison with January. Other

months and categories did not show a significant impact. Logging of dependent variable was not possibile due to zero values of percentage funded.

Table 6 – Results of linear regression

Variable	Estimate	Std. Error	Significance levels
(Intercept)	2.7713066	0.2253193	p<0.001
log(goal)	-0.2955560	0.0274179	p<0.001
average contribution	0.0032105	0.0003399	p<0.001
donors	0.0020149	0.0001084	p<0.001
factor(month)2	-0.2660861	0.0906706	p<0.01
factor(month)6	-0.2752320	0.0852012	p<0.01

The second model analyzed percentage funded as a dependent variable. In general, it showed similar results as the logistic regression with some particularities. Average pledge and number of donors had a significant impact, but their overall impact is low. Goal had also a negative impact on percentage funded as in the first model. Using not logarithmic values of goal we find that increasing goal by €1 decreases percentage funded by 0.006019%. Variables category and country were not significant, but we found a new significant variable, campaign start month. February and June had a significant negative influence on the collected amount of money. Other months showed also a negative, but not significant effect in comparison to January. On 90% significance level, we observed a positive impact of category Impact Hub, but a negative impact of projects located in the Czech Republic. These categories were not included in our table.

4 CONCLUSION

Crowdfunding has become one of most important form of alternative financing. Because of gaining money for a specific purpose, it is experiencing great success. Despite the significant progress in the Slovak and Czech crowdfunding market, the reward crowdfunding industry is still popular only amnog a certain part of the population, especially early adopters and social-minded. In comparison with the highly developed crowdfunding market in the USA, Kickstarter, his effect in the Czech and Slovak Republic is lower and it has a long way ahead.

There are significant differences between countries, too. The reward model is very popular in the Czech Republic, and Czech portals are main drivers of growth of reward crowdfunding in Slovakia. We have observed also significant differences between distributions of goal and success ratio between countries. The Slovak Republic has a less developed crowdfunding industry. On the other hand, donor and lending models play a more important role in Slovakia. The equity model is new for both countries with only 3 successful projects so far.

On the other hand, reward-based crowdfunding campaigns modelling was more difficult. The most important variable was goal with a negative influence on

success of campaign and also on percentage funded. We did not observe a significant impact of categorical variables such as category, country and origin portal. Seasonality assumption was confirmed only in percentage funded, but in general the impact was not significant. The relatively small sample could be also a source of these problems.

According to our results, we can give entrepreneurs some advice. When creating a campaign plan, they should be aware of setting their goals too high, because overestimating can lead to campaign failure. On the other hand, the goal should not be underestimated and authors should consider fees and other costs emerging in reward crowdfunding. Average contribution had a bigger impact than number of donors, and therefore we recommend to set slightly higher contributions compensated with more interesting rewards. Donors are ready to pay more money to get product in preference than in the classical way.

Our recommendation is to use more explanatory variables, according to other studies on social capital. Marketing could be another important factor, represented by video, pictures, shared content, number of rewards, and also promotion of project using social network websites and also crowdfunding platform.

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Measuring Appreciative Inquiry, Lean and Perceived Co-worker Health

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ABSTRACT

Purpose: The purpose of this paper is to present a developed questionnaire which measure Appreciative Inquiry, Lean values and co-workers health. The purpose is also to explore if and how Appreciative Inquiry correlates with Lean values and co-workers' perceived health in an organisation working with Lean.

Methodology/Approach: To investigate the relationship between Lean, Appreciative Inquiry and perceived co-worker health, a questionnaire was developed based on two previously tested questionnaires. The new questionnaire was answered by 841 co-workers at a Swedish municipality and was then analysed to explore in what way Appreciative Inquiry correlates with a number of Lean values as well as perceived co-worker health.

Findings: All variables were found to be significantly correlated with the variable 'Appreciative Inquiry'. The variable 'Continuous improvements' relates most to 'Appreciative Inquiry' followed by 'Eliminating Waste' as those variables can be considered to have a large positive relationship. 'Supportive Leadership' and 'System view' have a medium positive relation to 'Appreciative Inquiry' and the variables 'Health' and 'Customer focus' have a small relation to Appreciative Inquiry in this context.

Category: Case study

Keywords: Supportive leadership, Lean values, co-worker health, Appreciative Inquiry

1 INTRODUCTION

Global competition is constantly increasing, and this, together with the low-wage economies of the developing world, poses a substantial challenge to managers in the manufacturing, service and public service sectors (Radnor and Barnes, 2007). To meet this demand and to endorse changes and progress toward business excellence, management initiatives such as Quality Management (QM), Lean, Business Process Reengineering and Integral Health Management have been used, see for instance (Zwetsloot and Pot, 2004; Docherty, 2002). Those approaches are frequently deficit-based which means that they focus on problems and how to overcome them. When focusing on problems instead of possibilities, organisations are prevented from using their full potential which leads to decreased organisational capacity (Whitney and Trosten-Bloom, 2010). New managers request support to change the culture and need plans and approaches to reinforce positive loops in their workplaces (Calabrese, Cohen and Miller, 2013). By using Appreciative Leadership, the creative potential among co-workers can be organised and shaped into positive power (Whitney and Trosten-Bloom, 2010). This is important as work-life balance has a major influence not only on business productivity but also on the economy as a whole (Hughes, 2007). Wolf (2008) states that there are massive consequences for the workplace as mental sickness goes hand in hand with significant productivity losses. Many reasons for sickness absence are work-related and organisational but also affected by other factors (Janssen, et al., 2003). This paper focuses on the QM initiative Lean. Lean can have both positive and negative effects on the working environment and it depends on how it is practiced within the organisation (Hasle, et al., 2012). Recent research has found positive correlations between Lean values, Lean Leadership and co-workers' perception of their health (Bäckström and Ingelsson, 2015) but Lean has also been criticized for impacting negatively on the working environment. Research of the use of Appreciative Inquiry has increased drastically in recent years especially in public organisations (see for instance Carter, 2006), but research combining Lean and Appreciative Inquiry is rather rare (Hansen, 2015).

The purpose of this paper is to present a developed questionnaire which measure Appreciative Inquiry, Lean values and co-workers health. The purpose is also to explore if and how Appreciative Inquiry correlates with Lean values and co-workers' perceived health in an organisation working with Lean.

1.1 Appreciative Inquiry

Appreciative Inquiry is an initiative which borrows practices from the context of organisational development and is an incentive for a positive revolution in change (Whitney, Trosten-Bloom and Rader, 2010). According to Watkins and Cooperrider (2000), it is a theory, an approach and a mind-set used for analysing which leads to creativity and organisational learning. The Appreciate Inquiry activities, practices and processes focus on what is best for the organisation - in

the past, present and the future (Whitney, Trosten-Bloom and Rader, 2010). Bushe (2007), stresses the importance of generativity within Appreciative Inquiry, which he considers is both an input and an outcome. Cooperrider and Srivastva (1987), also argue that generativity is the core of Appreciative Inquiry. According to Grant and Humphries (2006), Appreciative Inquiry is rooted in the primes that language, knowledge, and action are inextricably linked, i.e. the ontological positions of social constructionists. Hence the language and behaviour are in focus in Appreciative Inquiry instead of social structure (Dematteo and Reeves, 2011).

In contrast to a deficit-based approach, Appreciate Inquiry is a positive approach to change, (Whitney, Trosten-Bloom and Rader, 2010), where generativity is in focus instead of problem-solving (Bushe, 2007). The problems should not be ignored, however by focusing on strengths, this approach is more effective, mainly when a change of situation, relationship, organisation or a community is wanted (Whitney, Trosten-Bloom and Rader, 2010). Appreciative Inquiry supports leaders in generating natural human organisations – knowledge-rich, strength-based, adjustable learning organisations (Whitney and Trosten-Bloom, 2010). According to Cooperrider's and Srivastava's research (1987), the focus on expanding successful experiences rather than problem detection leads to more creative and faster cultural change. The Appreciative Inquiry approach has played a central part in inspiring, engaging and empowering co-workers (Dematteo and Reeves, 2011). The Appreciative Inquiry approach also gives managers huge potential to create a culture of trust and collaboration based on respect (ibid).

1.2 Lean values

Lean is a management system considered to be receptive to the needs of people in business and bring better outcomes for key stakeholders (Emiliani, et al. 2003). Different values and principles have been defined by different researchers as the fundamental ingredients of Lean (see e.g. Liker, 2004; Womack & Jones, 2003 and Emiliani, 2010). Womack & Jones (2003) defined five principles of Lean and Liker (2004) describes Lean through 14 principles divided into four parts of a pyramid. Emiliani (2010) claims that the two main principles 'continuous improvement' and 'respect for people' need to permeate the organisation in order to achieve "real Lean" in oppose to "fake Lean" that is an overemphasis on continuous improvement. He further states that 'Your greatest challenge in Lean management will be to practice and deepen your understanding of the "respect for people" principle' (ibid p 53). The principle "respect for people" is usually ignored by senior management and this is something that needs to be corrected (Emiliani and Emiliani, 2013).

When an organisation applies Lean, the starting point should be to continuously benefit the customer and not for internal company reasons (Emiliani, 2010). According to Bicheno & Holweg (2009), the most common theme within Lean is

the external customer. The customer defines the values which are the critical starting point for Lean (Womack & Jones, 2003). Along with customer focus, the values continuous improvement, supportive leadership, system view and eliminate waste are also very apparent within Lean (see, for instance, Liker, 2004 and Emiliani, 2007). Liker and Franz (2011) state that continuous improvement within Lean is more than problem solving; it is a way to think and how the organisation learns. The value is also the last principle defined by Womack and Jones (2003) as well as the top of Liker's (2004) 4P pyramid suggesting that continuous improvement is the ultimate step in a Lean implementation. Bicheno & Holweg (2009), define a system approach as focusing on the organisation as a whole before paying attention to the parts. Womack & Jones (2003) claim that Lean stresses the supply chain seen as a value stream from the sub-suppliers to the ultimate customer. According to Seddon (2005), managing the organisation as a system consists among other things of having a design based on customer demand, value and flow. The elimination of waste is closely linked to creating flow in an organisation's processes (Liker, 2004 and Womack & Jones, 2003). The seven traditional wastes were defined by Taichii Ohno as: overproduction, waiting, unnecessary motions, transporting, over-processing, unnecessary inventory and defects (Bicheno & Holweg, 2009). Often untapped human potential is added as an eighth type of waste.

When working with Lean, the organisational culture is of importance. Liker (2004) argues that a mistake that is often made is to view Lean as a number of tools when in fact the tools are parts of a whole. They are not enough if you want to change an organisation's activities; in that case you need a deeper cultural change (ibid). Al-Najem, Dhakal and Bennett (2012) state that in order to succeed with Lean you need a healthy culture, skilled co-workers and a top management that understand and have bought the concept. In the work with achieving this organisational culture, leaders and leadership are crucial; there is a need for supportive leadership with focus on continuous improvements. According to Liker (2004), the manager's role is to change the culture through involving themselves in the actual work of identifying waste and value stream mapping. Liker (2004), further states that the managers within Lean are passionate about involving people and they have an in-depth understanding of the work as well as general managerial knowledge. Dombrowski & Mielke (2013) argue that the Lean leader can promote a better improvement culture through being a role model for his or her co-workers. Emiliani (2003) suggests that Lean leadership capabilities are built up via direct observation and participation in continuous improvement activities. According to Spear (2004), the values of Lean can be reflected in four lessons where the fourth is "managers should coach not fix".

1.3 Appreciative Inquiry and Lean

Hansen (2015) states that Appreciative Inquiry can be a way of adding new methods supporting any improvement strategy helping to address both realisation

efficiency and competence building. This is done not only in order to eliminate problems and short-term results but to also build an organisation's improvement capabilities. Combining Appreciative Inquiry and Lean could lead to new ways of addressing organisational challenges. Kongsbak (2010) describes the results from an organisation that combined Appreciative Inquiry and Lean in order to come to terms with high absenteeism and low productivity. The company had worked with Lean for a couple of years and by introducing the Appreciative Inquiry approach and letting the whole company dream of being 'most wanted as a facility and employees'. Over a period of two years they reached results within a number of areas. For example, the cycle time was reduced by 80%, customer complaints decreased by 10 % and the employee satisfaction survey increased from 3.6 to 4.37 on a scale from 1 to 5 (ibid).

Hansen (2012) states that the challenge in combining the two concepts is their different assumptions and basic approaches. He exemplifies some of the differences in relation to the approaches to create different improvements in an organisation (see Table 1).

Table 1 – Typical approaches in Appreciative Inquiry and Lean (Hansen, 2012)

Approach to create…	**Lean**	**Appreciative Inquiry**
value for the customer	Eliminate waste	Look for and grow value
efficiency and flow	Remove bottlenecks	Identify and expand best practice
effectiveness and quality	Reduce defects	Study and learn from perfection for the customer
continuous improvements	Identify problems, analyse root causes and fix them	Identify best practice, explore success factors and dream and design to improve

1.4 Perceived co-worker health

Resent research shows that QM practices are related to co-workers' well-being in a positive way (Liu and Liu, 2014), in the sense that QM can help co-workers to increase their feelings of belongingness and satisfaction but also reduce their work stress and work overload (ibid). According to Arnetz (2002), leaders have the opportunity to affect how co-workers view and experience efficiencies within their organisations. He proposes that co-workers who work in efficient organisations tend to be happier. This positive approach towards work offers an inclusive measure that shows both the level of balance between co-workers and organisations (ibid). Leadership inspired by Appreciative Inquiry has shown to affect the working environment in a positive way and decrease sick leave (Åslund, Bäckström and Richardsson, 2011). Something that is reinforced by Kongsbak (2010) who reports a decrease in absenteeism of 50% (from 12% to 6%) as one of the results from their work in combining Lean and Appreciative Inquiry.

A shared way of measuring co-worker health is by asking them about their health through questionnaires or interviews (Westlund and Löthgren, 2001). Theorell and Vogel (2003) argue that self-reported health is a respected indicator of co-worker health. On the other hand, there are complications in comparing self-reported health. Complications arise when the statements in the questionnaires are to be verbalized and additionally, the same word can have a different meaning to different co-workers (Nyberg, et al., 2005). Regardless of the difficulties in comparing and measuring co-worker health, self-reported health is one way to measure it and provides valuable information for further research (ibid).

2 METHODOLOGY AND CASE DESCRIPTION

To investigate the relationship between Lean, Appreciative Inquiry and perceived co-worker health, a questionnaire was developed based on two previously tested questionnaires. They both consist of a number of statements aiming at measuring different variables. One that measures co-workers' perceived health has been developed and tested by Lagrosen, Bäckström and Wiklund (2012) and has been used and re-developed in various research projects (see for instance Bäckström, Eriksson and Lagrosen, 2012a; Bäckström, Wiklund and Ingelsson, 2012b and Bäckström, Eriksson and Lagrosen, 2014). The other questionnaire measures a number of Lean values and has also been developed, tested and re-developed when used in different research projects, see Ingelsson, Bäckström and Wiklund (2010), Ingelsson (2013) and Ingelsson and Mårtensson (2014).

With those two questionnaires as a base, a new questionnaire with the purpose of measuring Lean values, Appreciative Inquiry and co-workers' perceived health was developed. The new questionnaire was compiled with three to five statements for the health index, Lean values and Appreciative Inquiry. The calculated variables consisting of three to five statements are formulated as follows:

Health:

1. I am usually alert.
2. I think my health is very good
3. I am almost always healthy

Continuous improvement:

1. We are constantly working on getting better in everything we do
2. We have time to work with improvements in everyday work
3. There is a standardized way of working with improvement in everyday work.
4. We focus on how we can improve things not on who made a mistake

System view:

1. I know what over-all goals the organisation has

2. I know how the work I do is connected to other parts of the organisation
3. I know how my work contributes to the over-all goals of the organisation

Customer focus:

1. I know who our customers are
2. I know what creates value for our customers
3. I know what our customers' needs are

Eliminate waste:

1. To eliminate waste is something we work with continuously
2. I know how to identify waste in my work
3. We solve problems when and where they arise

Supportive Leadership:

1. Our managers take responsibility for their actions
2. Our managers are constantly working to improve their own ways of working
3. Our managers are present in everyday work
4. There is a clear demand from our management that we should work with continuous improvements
5. Our managers are supporting us in our work with continuous improvements

The statement for the new variable, Appreciative Inquiry, was developed from theory (Hansen, 2012) and formulated as:

1. When things go really well, we usually take the time to understand the reason why
2. We often use our successes as a driver and the starting point for development
3. We often talk about our strengths and what we are really good at

A case study was carried out, using the questionnaire, in a small municipality in southern Sweden with about 15 000 inhabitants. The municipality was chosen as they have worked with Lean for several years. It employs 1 208 people and their human resources policy is based on the cornerstones of leadership, competence and participation. The municipality started to work with a common set of values in 1992 and since 2006 they have focused on Lean. They have not worked in a deliberate and structured way with Applicative Inquiry even though some of their values reflect the assumptions of the concept. Their fundamentals of Lean are:

- Supportive leadership
- Addressing the skills of employees
- Focus on value-adding activities
- Eliminate waste

- Long-term, holistic thinking
- Continuous improvement, step by step
- Simple tools
- No scapegoating

The municipality had a sick leave rate of 6.3% in 2013 among its permanent co-workers, which was an increased rate compared with 2012. They had a goal to reduce the sick leave rate to 3 % in 2015. Unfortunately the sick leave rate increased to 7.2 % in 2014 and the goal seems hard to achieve.

The study was carried out during the municipality's 40-hour residential course at Pärnu, Estonia, a course in which 1 074 co-workers and leaders participated. There were seven occasions in the fall of 2013 when the different co-workers were gathered and the questionnaire was handed out and collected by the researchers. A total of 841 co-workers filled in the questionnaire, which gives a response rate of 70% of all co-workers and 78 % of those who were present when the questionnaire was handed out. They were asked to mark on a seven-point agreement scale from 'Disagree strongly' to 'Agree strongly' to what extent they agreed with the statements. The data were then entered into the statistical program SPSS for further analysis.

The results from the questionnaire were first analysed to check the internal consistency and reliability between the variables for Health, Lean values and Appreciative Inquiry, by calculating the Cronbach Alpha. Secondly, the results were analysed in order to examine the relationship between Lean values and perceived co-worker health and the result was recently presented in Bäckström and Ingelsson (2015). The mean value and the standard deviation of each variable was also calculated. In order to meet the purpose of exploring if and how Appreciative Inquiry correlates with Lean values and co-workers' perceived health, the Pearson Correlation was calculated. In addition, the Spearman's coefficient of rank correlation was also calculated.

3 RESULTS

The results of the internal consistency reliability test of the variables are presented in Table 2. The test shows Cronbach Alpha values from 0.68 to 0.82 which can be considered as acceptable when three to five statements have been used. The mean value and the standard deviation for each variable are also presented in Table 2.

Customer focus has the highest mean value with 6.36 on the seven-point agreement scale and Appreciative Inquiry the lowest with 4.57. There is also some variation in the data where 'Appreciative Inquiry' and 'System view' have the highest standard deviation indicating a substantial variation in perception of those variables among the co-workers.

Table 2 – Cronbach Alpha, mean and standard deviation for Appreciate Inquiry, Health, and Lean values.

Variable	No of Statements	Cronbach Alpha	Mean	St dev
Appreciative Inquiry	3	0.71	4.57	1.10
Health	3	0.78	5.78	1.00
Eliminating waste	3	0.69	4.81	1.09
Continuous improvement	4	0.70	5.05	0.98
Customer focus	3	0.68	6.36	0.67
Supportive Leadership	5	0.82	5.46	1.03
System view	3	0.71	5.37	1.10

The results of the calculated Pearson and Spearman correlation between the variables of Lean values and Health and its connection to the variable 'Appreciative Inquiry' are presented in Table 3. As can be seen in the table, all variables were positively highly and significantly correlated with the variable 'Appreciative Inquiry' but a low strength of correlation can be highly statistically significant with a large sample, such as in this case. The variable 'Continuous improvements' relates most to Appreciative Inquiry followed by 'Eliminating Waste' as those variables can be considered to have a large relation according to Cohen (1988). 'Supportive Leadership' and 'System view' have a medium positive relation to 'Appreciative Inquiry' and the variables 'Health' and 'Customer focus' have a small relation with Appreciative Inquiry in this context (ibid).

Table 3 – Correlations between Appreciate Inquiry and Health and Lean values.

Variables	Pearson	Sig.	Spearman	Sig.
Continuous improvements	0.627**	0.000	0.628**	0.000
Eliminating Waste	0.555**	0.000	0.536**	0.000
Supportive Leadership	0.476**	0.000	0.476**	0.000
System view	0.368**	0.000	0.370**	0.000
Health	0.234**	0.000	0.219**	0.000
Customer focus	0.262**	0.000	0.267**	0.000

** Correlation is significant at the 0.01 level.

4 CONCLUSION AND DISCUSSION

The presented and tested questionnaire can be used to measure to what extent the values Appreciative Inquiry, Lean values and co-workers health permeates organisations since the internal consistency for all variables can be considered

acceptable. It can be used as a tool for measuring the start of a Lean initiative as well as monitoring progress. The questionnaire can also be used in order to investigate to what degree those variables correlate in order to see what variables are connected and what areas to focus on.

The result from the municipally shows that all the mean values of the calculated variables have a proportionately high value. The lowest are Appreciative Inquiry, which is not strange as the organisation has not worked with that approach. The variable 'Health' which measures co-workers perception of their health had the second highest mean value with 5.78 on a seven-point scale. At the same time, the sick leave is high in the municipality but those co-workers on sick leave did not have the opportunity to fill in the questionnaire. The sick leave among the co-workers had also increased during the last two years although they had worked especially with those issues and with Lean. As earlier research has found connections with Appreciative Inquiry initiative and healthy co-workers (Kongsbak, 2010; Åslund, Bäckström and Richardsson, 2011), a good piece of advice to the organisation is to start working with the Appreciative Inquiry approach in combination with the Lean initiative they have already started. This is also in line with Al-Najem, Dhakal and Bennett (2012) who argues that in order to succeed with Lean, the organisation needs a healthy culture, skilled co-workers and a top management that understand and have bought the concept.

The correlation between Appreciative Inquiry and the co-workers' perception of their health was positive but there was a low correlation in this case. Appreciative Inquiry may help the organisation to work in a structured and conscious way to increase the sick leave. The co-workers present at work consider themselves to be healthy but a structured and conscious way of working with Appreciative Inquiry may prevent more co-workers from getting sick and encourage development. The Lean value 'Continuous improvements' has the strongest relation to Appreciative Inquiry. This could indicate that the organisation is working with Continuous improvements with a positive "touch" which in turn can indicate that they not only eliminate problems and achieve short-term results but also build the organisation's improvement capabilities (Hansen, 2012).

Customer focus has the highest mean value with 6.36 on the seven-point agreement scale in this case which can be considered as a result of their Lean improvement work but also an unusual result as the investigated organisation is a municipality. The results show that their Lean improvement is done according to Emiliani (2010), who claims that the work with Lean should be to benefit the customer and not for internal company reasons. It is also in line with Bicheno & Holweg (2009), who argue that the most common subject within Lean is the external customer and Womack & Jones (2003), who maintain that the customer defines the values which form the critical starting point for Lean. This is an additional indication that their Lean improvement work has been successful and that they are ready to take the next step and combine Lean with Appreciative Inquiry in a way similar to what Kongsbak (2010) describes, a case where they had decreased their absenteeism by 50%.

5 FUTURE RESEARCH

Can the correlation between Appreciative Inquiry and the co-workers' perception of their health have been influenced by the fact that the organisation has not worked with Appreciative Inquiry in a structured way? That is an interesting question that deserves to be investigated further in future research projects in the studied organisation.

The value 'respect for people' is highlighted by researchers as well as by Toyota themselves (Emiliani, 2012). It is also pointed out that the lack of focus on this value leads to 'fake Lean' when striving to eliminate problems and focus on short-term results is done at the expense of 'respect for people'. It would be interesting to further develop the questionnaire to include the value 'respect for people' and to examine closer the relationship between Appreciative Inquiry and 'respect for people'. Could it be that Appreciative Inquiry is the key to new structured way of accomplishing 'real Lean' since Calabrese, Cohen and Miller (2013) claim that the Appreciative Inquiry approach gives the managers huge potential to create a culture of trust and collaboration based on respect?

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The Quality Costs Assessment in the Aspect of Value Added Chain

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ABSTRACT

Purpose: The main purpose of this paper is to focus on the quality costs influence direction and intensity on the added value in the aspect of value chain.

Methodology/Approach: The article is based on a nomothetic point of view that includes three modules: conceptual, hypothetical – deductive and inductive methods. To formulate theoretical aspects of quality costs evaluation, comparative and chronological analysis of scientific literature is used. Empirical results of the research are obtained by applying method of expert evaluation.

Findings: During expert evaluation procedure is identified and selected significant quality costs elements. It is a useful tool to identify quality costs thought value chain processes. Created model of quality costs assessment in the aspect of value added chain is based on identification and classification of quality costs elements and allows to measure and to evaluate influence of quality costs, its direction and intensity on the added value.

Research Limitation/implication: The formulated model of quality costs assessment in the aspect of value added chain is assigned to the models that "are oriented towards the situation", i.e. diverted towards organizational analyses.

Originality/Value of paper: The paper complements the gap between theoretical and practical framework of determining influence of quality costs on added value and proves importance of the assessment of quality costs elements in the aspect of added value chain.

Category: Research paper.

Keywords: Quality costs; added value chain; Added value; manufacturing industry.

1 INTRODUCTION

For many years scientists and practitioners have identified quality as a strategic element that generates added value. Moreover, scientists acknowledge that the added value that is generated during the activity of quality improvement is recognized as a tool which helps to regulate market share, to coordinate and to satisfy the needs of stakeholders and to receive economic benefit. Direct organization investments towards quality improvement activities determines the need to monitor and analyse the results of improvement activity and to make new, economically reasonable decisions. According to Campanella (1999) and Wood (2013) the assessment of the investment directed towards quality and the loss associated with quality can be made through application of the analysis of quality cost.

Atkinson (1999) argued that quality costs show the organization a better way towards better quality of activity and financially "healthier activities". Rust, Moorman and Dickson (2002) concluded that quality costs indicate the present level of quality, return on investment and the further trends of quality improvement. The peculiarities of assessment and analysis of quality costs were discussed in the works of quality costs identification through the analysis of the finished product by Bamford and Land (2006), Miguel and Pontel (2004); also by Weheba and Elshennawy (2004), Omachonu, Suthummanon and Einspruch (2004). The peculiarities of assessment and analysis of quality costs in different spheres of industry were carried out by Tye, Halim and Ramayah (2011), Uyar (2008), Tannock and Saelem (2007), Sower, Quarles and Broussard (2007), Ramdeen, Santos and Chatfield, (2007). Other researchers highlighted the importance of quality costs assessment in the applied research area. For example, Ramudhin, Alzaman and Bulgak (2008) performed survey in case of supply chain of quality costs analysis. The conceptual article about the conception of adjustment of quality costs and the applicable methods of accounting was prepared by Fons (2012). The logic of identification of quality costs was presented by Chopra and Garg (2011). The methods of quality costs simulation were summarized by Freeman (2008). The issues of heterogeneity, diversity and complexity of quality costs were reviewed by Emsley (2008).

Despite much research related with the quality costs it needs to be admitted that most of quality costs assessment researches are similar to each other and they state a certain dependency of quality costs alterations on high-quality product or on some individual processes. Researches underestimate the interfaces between quality costs and value creating processes. Such the assessment of quality costs that is often fragmentary becomes inexpedient and it does not provide reasoned information in the decision making process (Eldridge, Balubaid and Barber, 2006). Moreover, according to Reed, Lemak and Mero (2000), Tena, Llusar and Puig (2001), the concept of quality is adjusted by changing environment, which influences changes of quality costs system as well. In accordance with new approach quality is not just usual description of product or service quality. Quality in a broad sense reflects the systematic point to the organization’s

activity quality. According to this approach the system of quality management covers the activities of all organizational processes; which correspond to the part of the added value generating systems (Kaplinsky, 2000, 2004; Kaplinsky and Morris 2001, Barnes, 2002; Christopher, 2005).

The aim of this paper is to address the following research question: what connection is between quality costs and added value? The latter issue is divided into two separate issues: what quality costs influence the value added chain and what is the tendency and intensity of this influence? In order to address this research question, this paper integrates logical and systematic analysis of scientific papers. To set up connections between quality costs and added value the authors develop and test model of quality costs assessment in the aspect of value added chain and conclude with some reflections from the case study.

2 GENESIS OF QUALITY COSTS CONCEPT

Quality costs concept

While the academic literature on quality costs can be traced to the 1950s (Juran, 1951; Feigenbaum, 1951; Lesser, 1954), construction of the quality costs theory related with empirical results is a much more recent development. A considerable amount of quality costs literature has been focused on quality costs implementation rather than searching answers to 'why' issues. It is not probably surprising that scientists and practitioners question the benefit of quality costs.

One of the most problematic issues that need to be mentioned is related with appropriate quality costs definition. According to Machowski and Dale (1998), Wood (2013), there is no common agreement regarding unified and clear description of quality costs; therefore sometimes there is a confusion because of different terms of quality costs. Usually quality costs are understood as the total amount of conformity and unconformity quality costs, when conformity cost are attributed to prevention and assessment quality costs in order to avoid unconformity, and unconformity quality costs are attributed to the internal and external non-conformance quality costs (e.g.: product's return or re-production).

Dale and Plunkett (1995, 1999) argue that the quality costs are the costs incurred by the quality management system design, implementation, management and costs related to the continuous improvement, product or service failures and all other costs needed to achieve appropriate level of product or service quality. The issue of Australian Standard (2012, pp.8) provides quality costs definition related with a "costs incurred from failing to provide the required product in the most efficient and effective manner". However, it is important to note that some authors understand quality costs as costs incurred due to non-qualitative product, while other authors describe quality costs as loss related to inefficiency of organizational activity. It is not sufficient to understand quality costs as a set of assessment of loss. This view is supported by Omachonu, Suthummanon and

Einspruch (2004), who argue that quality costs relate with a possibility to increase product value, process output and customer satisfaction. These findings link quality costs with an added value concept which identifies clear relationships between the organization's activities, products, and processes. Considering aspects of added value, a description of quality costs becomes too narrow concept, i.e. description of quality costs has to integrate the costs related to processes quality and quality costs related to products/service quality. Based on these assumptions quality costs could be described as:

1. added value chain quality costs intended to warranty the implementation of defined characteristics during the resources into the product transformation process; and
2. added value chain failure quality costs related with a non-conformance quality caused problems and effects.

Classification of quality costs

Classification of quality costs is one of the main tasks in order to identify, account and analyse quality costs. Organization that decided to manage quality costs has to choose proper model of quality costs, which includes categories and elements of quality costs (Omachonu, Suthummanon and Einspruch, 2004; Ramdeen, Santos and Chatfield, 2007, Akkoyun and Ankara, 2009).

Crosby (1979 a, b), Juran and Gryna (1988) developed basics of quality costs classification and assessment by classifying types of quality costs to preventive, appraisal, internal and external failure quality costs. Preventive and assessment costs are ascribed to the group of conformance quality costs, internal and external failure quality costs are ascribed to the group of non – conformance quality costs.

This paper is based on traditional grouping of quality costs to categories of prevention, appraisal, internal failure and external failure quality costs.

The more complex question of how prevention, appraisal, internal failure and external failure quality costs could be described has also been found in a number of scientific papers (Buthmann, 2007; Krishnan, Agus, and Husain, 2000; Kim and Nakhai, 2008; Campanella, 1999; Kaner, 1996). Prevention quality costs are the costs committed for the actions within the purpose to avoid defects and discrepancies and to minimize failure costs and costs related to inspection and testing (Buthmann, 2007; Krishnan, Agus, and Husain, 2000; Kim and Nakhai, 2008; Campanella, 1999; Kaner, 1996). According to Porter and Rayner (1992), in order to define prevention quality costs organizations should evaluate situation (and possible situation) that could influence organization ‘s results. Prevention quality costs also can be treated as an activity in striving to improve processes and decrease waste. Yang (2008) recommends including into prevention quality costs category: quality planning activities, new products review actions, training, and process development and management activities.

According to the statement of Cheah, Shahbudin and Taib (2011), prevention quality costs are related to the creation, implementation and support of quality management system. Prevention quality costs are being planned and incurred before execution of different activities. Srivastava (2008) also agrees with this point of view by stating that prevention quality costs are related to the costs of any activity intended to research, warranty and decrease discrepancies.

Sörqvist (1998) indicates that prevention costs are not the costs intended for actions of bad quality correction, it is an investment to activity that warranties certain level of quality. These costs could be evaluated in parallel with costs of loss.

Theoretically, the idea of prevention costs assessment allows organizations to evaluate quality improvement costs in association with the failure costs. Moreover, the obtained results could outline an optimal quality level. However, it is hard to implement such a system from a practical way. Usually in practice organizations can evaluate only a small part of actual quality costs. According to the Sörqvist (1998) segmentation method such quality costs is related to the risk of optimization.

Based on the theoretical analysis results, the authors of the paper describe prevention quality costs as the costs intended for the quality improvement investments in order to prevent defects and discrepancies. As well as to decrease failure quality costs and costs related to inspection and testing (assessment quality costs).

Appraisal quality costs are the costs incurred by assessing the state of products and processes in order to determine if they correspond to the requirements or specifications (Buthmann, 2007; Kim and Nakhai, 2008; Kaner, 1996). According to the Krishnan, Agus and Husain (2000), appraisal costs are being incurred in striving to determine level of correspondence to quality requirements. Srivastava (2008) agrees that appraisal quality costs are the costs intended to assess correspondence to the requirements and their calculations include costs related to the work verification and control process.

In case of every organization appraisal quality costs have to be optimal. Constantly increasing appraisal quality costs can show badly designed processes and constant need for quality improvement actions.

In order to assure the correspondence to establish requirements level appraisal quality costs are related to the assessment of purchased raw materials, outsourced processes, products and services and etc. (Kim and Nakhai, 2008). Moen (1998) states that problem of quality costs assessment is related to the fact organizations do not determine added value. The big amount of appraisal quality costs can indicate the problems related with a product or internal process improvement necessity.

The above observations call for a comprehensive review of the appraisal quality costs place in the quality costs classification framework (conformance quality costs and non-conformance quality costs).

The appraisal quality costs are costs of routine activity assessment that are based on product or process specifications and that help to warranty the certain quality level of product or process (for example: calibration, inspection, testing and so on), therefore this study keeps latter opinion.

Internal failure quality costs are the costs incurred due to mistakes that indirectly influence customer (Buthmann, 2007; Kiani, et al., 2009; Kim and Nakhai, 2008; Kaner, 1996). In other words, internal failure quality costs are the costs incurred due to mistakes, which are determined inside organization, when products haven't reach customer. Internal failure quality costs cover such elements as surplus of resources, repair of product under manufacturing, downtime, waste and other. Assessment of these costs is complicated; they can include even such elements as investigation of employees' complaints, fines for badly prepared financial reports and so on. Internal failure quality costs occur only in case established quality standards were not reached by work results and that is being determined before transferring the product to customer (Cheah, Shahbudin and Taib, 2011).

Srivastava (2008) states that internal failure quality costs are closely related to discrepancies determined in stages of processes and products quality warranting. Krishnan, Agus and Husain (2000) divide internal failure quality costs into two groups. The first group of internal failure costs includes the costs related to planning work and results of inappropriate decision making, for example, costs related to hiring of employee with inappropriate qualification, dispersion of inappropriate process attitude and etc. The second group of internal failure costs includes costs related to organization routine activity, i.e. everyday activity. These quality costs could be easily identified by process participants. However, the authors of the paper highlight that often in organizations they are being assessed as „acceptable norm".

The authors of the paper describe failure quality costs as the costs that incurred due to mistakes, that are being identified inside organization (in processes, activity, during assessment of product's quality and etc.), when products do not reach customer. In the same way it gives organizations a possibility to assess not only internal failure costs but also to identify places where they occur. Based on such information, organization can take grounded quality improvement decisions by relating them to quality costs intended to preventive or assessment activity.

External failure quality costs are the costs incurred due to mistakes that directly influence customer (Sower, Quarles and Broussard, 2007; Buthmann, 2007; Kiani, et al., 2009; Kim and Nakhai, 2008; Kaner, 1996). In Campanella (1999) and Wood (2013) opinion, external failure quality costs category includes complaints of customers, costs of warranty services, loss of trade mark, costs of decrease of market part and other. In scientific literature external failure quality

costs often are named as costs of lack of responsibility. In Srivastava's (2008) opinion, external failure quality costs are the costs that appear after transfer of the product to customer, i.e. during use of the product. Most often they could be identified when discrepancies, defects, spoilage and similar defects appear when customers use the product and which became known to organizations because of the customers' claims, activity of warranty services, and costs of product replacement. Krishnan (2006) divides external failure costs into two groups. Into the first group of external failure quality costs the author includes the costs that are related to delivery of the product to customer and period of warranty service. As an example the author presents the costs of warranty service, costs of wrong delivery of product, costs of loss of customers and so on. Into the second group of external failure quality costs the author includes the costs that are related to the costs incurred by customer due to late product delivery and etc., and which are being compensated by organization with penalties. However, in some cases such descriptions of external quality costs related to product's end user do not reflect structure of all external quality costs. Examples presented by Curkovic, Sroufe and Landeros (2008) show that lot of organizations had to pay huge penalties and fines during the last few years due to inappropriate storage and utilization of waste. The authors of the paper state that external failure quality costs should cover not only the costs related to customers but also the quality costs related to other stakeholders that organization's activity makes an impact, management structure and etc.

External failure quality costs are treated as one of the most significant quality costs evaluation of which is the most difficult in comparison to other categories of quality costs (Sower, 2004). This statement is based on the findings that external failure quality costs are being suffered directly by customers and size of these costs in many organizations reaches 50 – 90 percent of total quality costs.

Despite clear enough descriptions and relationships between quality costs categories, the detail elements of quality costs categories' as an operationalized construct is a gap in quality costs literature. Depending on the character of an analysed industry many authors present different elements of quality costs. As reported by Dale and Plunkett (1999) summarized lists of quality costs can be used as guidance or as a source of ideas. Scientists or practitioners should take into account each industry specifics and their quality costs drivers. The major drawback of this approach is the lack of similar quality costs sets which could be used for a benchmarking purpose.

The assessment of quality costs has also been a subject of a number of research. Edward and Sahadev (2011) point out that assessment of quality costs and preparation of reports is the first step towards a program of quality costs management. Information on quality costs can be used to highlight the most important improvement actions and to ground initiation of quality development activities (Edward and Sahadev, 2011; Sharabi and Davidow, 2010). Organizations could expect more valuable benefit only in the case if all quality costs are being assessed. Assessment of quality costs increases possibilities to

find costs that usually are reflected in organization's additional expenses. Harington (1987), Akkoyun and Ankara (2009) state that, it is important to coordinate the system of quality costs assessment with activities of process development, i.e. to use the results of quality costs analysis for the continuous processes or product improvement. Harington (1987) emphasizes that one of the most important quality costs assessment advantages is that decreasing quality costs tendencies can be the best way to increase organization's profit by improving quality and decreasing the need for additional work resources, raw materials and other elements. Although, quality costs assessment is not only a quality costs management driver; it can also materially affect the reliability of the assessed quality cost (Tawfek, Mohammed and Razek, 2012). A key problem with these arguments is that researches usually provide general view on the assessment of quality costs. The complex relationships between various quality costs elements arise the question of quality costs assessment field and depth. Another big problem related with quality costs assessment is the use of obtained information, which is in many cases related abstractly to the results of improvement activity. This shows that in many cases attention is given to systems and methods of quality costs, but not the results and possibilities for improvement.

As such, the quality costs genesis represents significant problems of quality costs theory construction and testing in the aspect of added value chain. Accordingly, there is need to address the issue of quality costs in measuring added value. In addition, any conceptualization of the quality costs – added value relationship should consider decomposition of organization as sophisticated systems in space of processes, identification of quality costs elements, their grouping into categories of quality costs by performing comparison of their relations to indices reflecting added value.

3 RESEARCH FRAMEWORK

Performed analysis of scientific literature content allowed formulation of reasoned assumptions for creation of a research framework of quality costs assessment in the aspect of value added chain. In the first figure, a scheme of logical steps in the creation of a research framework of quality costs assessment in the aspect of value added chain is proposed.

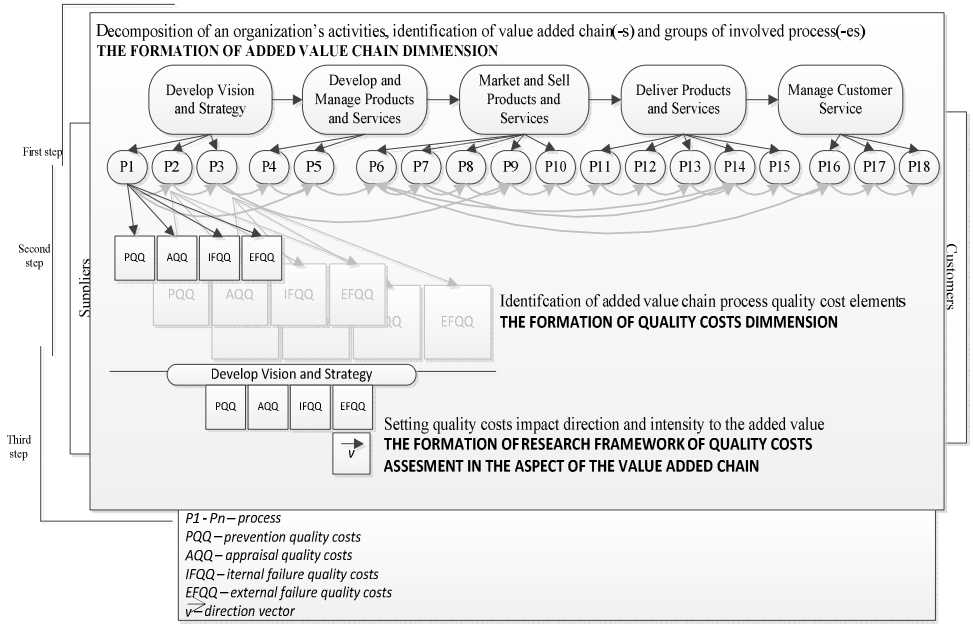

Figure 1 – A scheme of logical steps in the creation of a research framework of quality costs assessment in the aspect of value added chain

First step: the formation of added value chain dimension. According to deductive point of view, by the first step of the research framework of quality costs assessment in the aspect of value added chain, creation obliges to perform decomposition of an organization's activities, identification of value added chain(-s) and groups of involved process(-es). This step is based on Process Classification Framework (APQC, 2012).

Second step: the formation of quality costs dimension. The second step of the research framework of quality costs assessment in the aspect of value added chain from hypothetic-deductive point of view is related to the formation of quality costs dimension in the aspect of added value chain.

The assessment of quality costs in the aspect of added value chain is closely linked with the analysis of process performance. In order to find the most appropriate way to classify quality costs of added value chain, the procedure of this step is based on Multiple Criteria Decision Analysis (MCDA) methodology. Considering principles of Multiple Criteria Decision Analysis principles is formed two directions of quality costs classification system in an aspect of added value chain:

1. Assurance of complex assessment of quality costs.
2. Distinguish of quality costs elements for process quality assessment and continuous improvement decisions (Dale and Wan, 2002).

Numerous studies have argued that quality costs evaluation methods, concentrate on the certain quality-related activities, which explains the general quality costs, but not all of the interrelated processes activities (Chopra and Garg 2012, Chopra and Garg, 2011; Fons, 2012, Luther and Sartawi, 2011; Ramudhin, Alzaman and Bulgak, 2008, Kim and Nakhai, 2008). The first direction of quality costs classification system in an aspect of added value chain is to fulfil the gap of the existing quality costs research results. Assurance of complex assessment of quality costs facilitates a systematic and complex approach to the assessment of all added value chain quality costs elements. Goulden and Rawlins (1995) argue, that based on the philosophy of continuous improvement, quality cost analysis should show quality cost of each process, rather than the overall product quality costs. Therefore, facing with identified quality cost evaluation problems in order to complete a list of quality costs elements there were analysed a set of scientific papers (Chopra and Garg 2012; Fons 2012, Chopra and Garg, 2011; Abdelsalam, and Gad, 2009; De, 2009; Akkoyun and Ankara, 2009; Jaju, Mohanty and Lakhe, 2009; Srivastava, 2008; Ramudhin, Alzaman and Bulgak, 2008, Yang, 2008; Calegre and Papa, 2007, Eldridge, Balubaid, and Barber, 2006; Bamford and Land, 2006; Weheba and Elshennawy, 2004; Giakatis, Enkawa and Washitani, 2001; Roden and Dale, 2000; Juran and Gofrey, 1998) and standards (Australian Standard AS 2561-1982, 2012).The list of quality costs was used to conduct expert evaluation. The purpose of empirical study was to find out the key quality costs of value added chain processes and to specify quality costs categories relations between the value added chain processes. The research focused on significant well-founded variables. Due to explanatory nature of the analysis was chosen a qualitative research strategy. There was conducted a list of independent experts who were asked to evaluate the importance of added value chai quality costs elements and provide comments. The research data accumulation was based on saturation effect. For the evaluation of importance quality costs elements in the aspect of added value chain there was used 5 points Likert scale. To evaluate scale internal consistency there was calculated Cronbach's alpha coefficient (α=0,995). To test the compatibility of experts' opinion, Kendall's coefficient W was calculated. Based on the accumulative effect of preventive actions (Lorente, Rodriguez and Rawlins, 1998) relationships were tested between quality costs elements in each added value chain process, in each group of value added chain process and in all added value chains (see Figure 2).

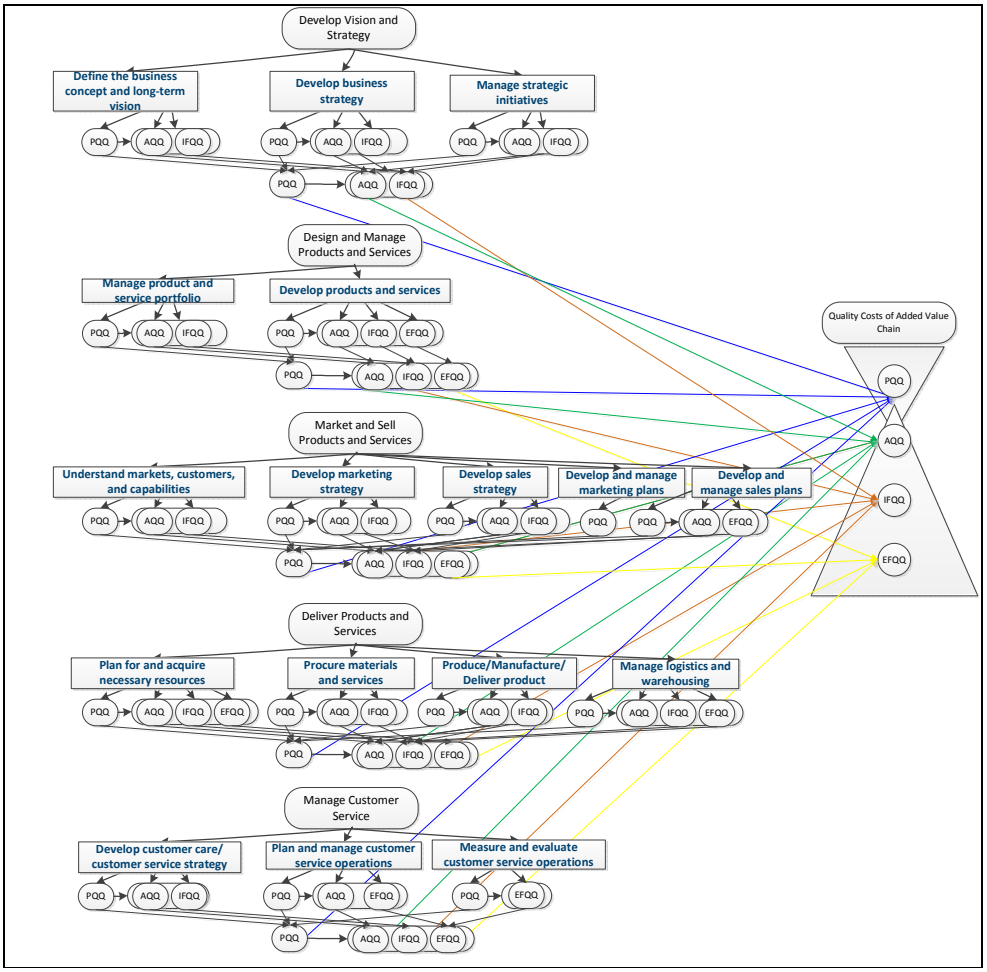

Figure 2 – The relationship between quality costs elements in each added value chain process, in each group of value added chain process and in all added value chain

A detail list of quality costs is presented in Appendix.

Third step: the formation of research framework of quality costs assessment in the aspect of the value added chain. By the third step, according to nomothetic point of view and inductive method and the second direction of Multiple Criteria Decision Analysis (i.e. Distinguish of quality costs elements for process quality assessment and continuous improvement decisions) was performed research framework of quality costs assessment in aspect of the value added chain.

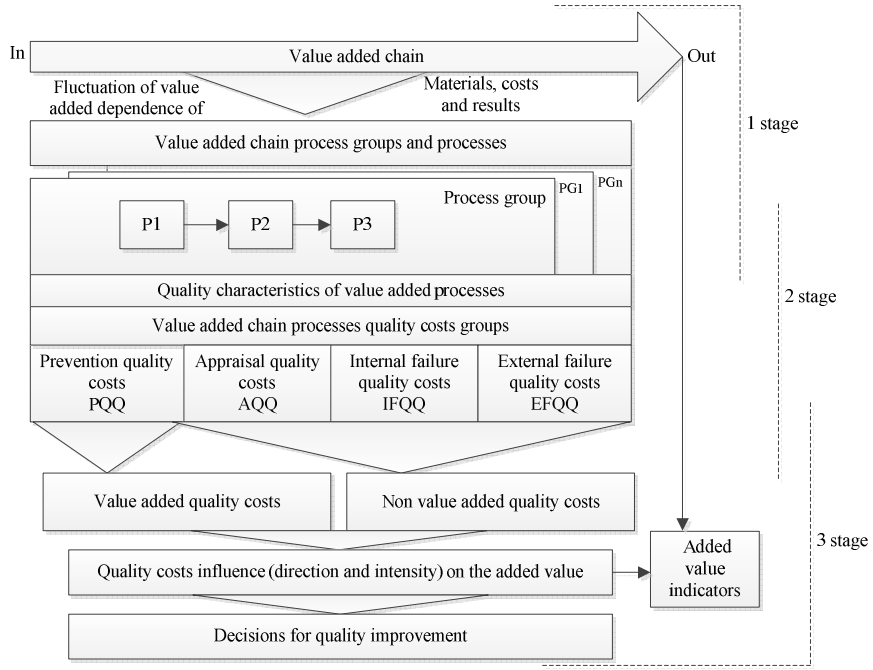

Figure 3 – Research framework of quality costs assessment in the aspect of added value chain

Research framework of quality costs assessment in the aspect of added value chain was composed of exogenous variables - prevention quality cost, appraisal quality costs, internal and external failure quality costs and endogenous variables - added value indicators (e.g. productivity, operational efficiency, customer satisfaction, etc.). During modelling stage was taken into account the economic meaningfulness, econometric bias and validity.

Research framework provides clear steps to follow quality costs assessment in aspect of the added value chain.

The first stage of quality costs assessment research framework in the aspect of added value chain consists of identification of added value chain and its process groups and processes. Moreover, in this stage organizations have to define indices reflecting added value alteration.

The second stage is seen as quality costs in the aspect of added value chain identification stage. Because of this, the research framework is used to calculated quality costs that are divided into the quality costs that create added value and the quality costs that do not create added value.

The quality costs genesis showed that quality costs in scientific studies are mostly divided into groups of conformity and nonconformity quality costs that are divided into groups of categories of preventive, appraisal, internal failure and external failure quality costs (Castillo-Vilar, Smith and Simonton, 2012;

Rambudhin, Alzaman and Bulgak, 2008; et al.). Scientific research confirmed that there exists a negative relation between groups of preventive and appraisal as well as internal and external failure quality costs, i.e. increasing preventive and assessment quality costs decreases internal and external failure quality costs. However, it was determined that many scientists neglect accumulative effect of prevention quality costs to appraisal, internal failure and external failure quality costs. Therefore, during expert assessment were confirmed theoretical insights of Lorente, Rodriguez and Rawlins (1998). As a result, prevention quality costs were ascribed to the group of quality costs that create added value (value added quality costs), and appraisal, internal failure and external failure quality costs were ascribed to the group of quality costs that do not create added value (non-value added quality costs).

Based on the multi-criteria decision making principles, in order to confirm relations between calculated value added quality costs and non-value added quality costs are calculated correlation coefficients. Mathematically quality costs are calculated as follows:

$$k(VAQQ) = a_{VAQQ} + b_{VAQQ}k(t) \quad (1)$$

$$b_{VAQQ} = \frac{\sum_{i=1}^{n} k(t_i)k(VAQQ) - n(n+1)^2/4}{\sum_{i=1}^{n}[(t_{iVAQQ})]^2 - n(n+1)^2/4} \quad (2)$$

$$a_{VAQQ} = (1 - b_{VAQQ})(n+1) \quad (3)$$

$$k(NVAQQ) = a_{NVAQQ} + b_{NVAQQ}k(t) \quad (4)$$

$$b_{NVAQQ} = \frac{\sum_{i=1}^{n} k(t_i)k(NVAQQ) - n(n+1)^2/4}{\sum_{i=1}^{n}[(t_{iNVAQQ})]^2 - n(n+1)^2/4} \quad (5)$$

$$a_{NVAQQ} = (1 - b_{NVAQQ})(n+1)/3 \quad (6)$$

Where:

VAQQ – value added quality costs;
NVAQQ – non value added quality costs;
t – period of time;
k(VAQQ) – i, VAQQ value in increasing t curve;
$k(t_{iVAQQ})$ – i, t value in increasing t curve;
k(NVAQQ) – i, NVAQQ value in decreasing t curve;
$k(t_{iNVAQQ})$ – i, t value in decreasing t curve;
n – number of recorded data.

All quality costs are calculated as a sum of value added quality costs and non-value added quality costs:

$$TQQ = \sum_{i=n} k(VAQQ) + k(NVAQQ) \quad (7)$$

Where:

TQQ – total quality costs.

In striving to determine relations between value added quality costs and non-value added quality costs, in the third stage, a multiple linear regression analysis is performed. According to Cekanavicius and Murauskas (2014) regression analysis allows to forecast values of endogenic variable according to values of exogenous variables. Relations between value added and non-value added groups of quality costs (*VAQQ* & *NVAQQ*) are considered statistically important when significance level of the test is not bigger than 5 percent ($p < 0,05$). In striving to determine suitability of multipartite linear regression method, there is calculated a coefficient of determination (R^2). With the reference to the sample size and number of independent variables, in case of multiple linear regression there can be used an adjusted coefficient of determination (R^{2adj}). Adjusted coefficient of determination shows part of dispersion of endogenous (added value) variable that could be explained by exogenous variables (quality costs).

In this stage the influence of quality costs to added value is also calculated. For that purpose, Setijono and Dahlgaard (2008) two-dimentional vector of influence is also calculated. First part of vector's equation $\left(\frac{\mathrm{VA_t}}{\mathrm{VAQQ_t}}\right)$ shows the influence of value added quality costs to added value (VA_t), the second part of vector's equation $\left(\frac{\mathrm{NVAQQ_t}}{\mathrm{VAQQ_t}}\right)$ reflects the influence of value added quality costs to non-value added quality costs. With a reference of presumption changing value added quality costs influence vector change. Since dependence between variables is expressed by relative size, in order to denominate analysed data, two-dimensional influence vector $\bar{v}$ was transformed into scalar equation (7).

$$\bar{v} = \sqrt{(\frac{VA_t}{VAQQ_t})^2 + (\frac{NVAQQ_t}{VAQQ_t})^2} \tag{7}$$

Two-dimensional influence vector's value is equal to $\sqrt{2}$=1.41. If calculated two-dimensional influence vector exceeds an estimated value, it shows that organization's investments to quality improvement activities were not sufficient and it has a negative impact on added value. Two-dimensional influence vector allows showing new bounds for the generalization of quality costs impact on added value.

4 PILOT STUDY RESULTS

The instrument to test the relations between value added quality costs and non-value added costs was a case study. The research was carried out during the period of a whole year from 2012 January till 2013 January in the textile manufacturing company. A quality costs analysis draft was based on the elements of quality costs in the aspect of added value chain (see *Appendix*) which were confirmed by the experts. Data were collected through in-depth financial, statistical and accounting data analysis and in-person interviews.

The non-value added quality costs in comparison with total amount of quality costs were divided in the groups of the value added chain processes as follows:

In the group of vision and strategy development processes (define the business concept and long-term vision; develop business strategy; and manage strategic initiatives) the non-value added quality costs present a small part (5%) of total quality costs amount. The non-value added quality costs of the products development and management processes group (manage product and service portfolio; develop products and services) were equal to 18% of total quality costs amount. The non-value added quality costs of the products sale development processes groups (understand markets, customers, and capabilities; develop marketing and sales strategy; develop and manage marketing plans; develop and manage sales plans) were equal to 13% total quality costs amount. The non-value added quality costs of the group of products manufacturing and presentation (plan for and acquire necessary resources (Supply Chain Planning); procure materials and services; produce/manufacture/deliver product; deliver service to customer; manage logistics and warehousing) were equal to 36 % of total quality costs amount. The non-value added quality costs of the group of customers' service management (develop customer care/customer service strategy; plan and manage customer service operations; measure and evaluate customer service operations) were equal to 28% of total quality costs amount. All non-value added quality costs of the whole value chain were equal to 45% of total quality costs amount.

Therefore, in order to check the logic of the effect of the value added chain's processes quality costs effect on the value added assessment model, the total amount of all value chain's value added quality costs and non-value added quality costs were analysed and each month's two-dimensional influence vector was calculated. The costs of defective products were chosen to represent added value (*VA)* indicator.

The obtained results reveal that during the periods where the value added quality costs exceed the non-value added quality costs, the calculated two-dimensional influence vector did not exceed nominal value (1,41). It means that the increased value added quality costs influence both the decrease of non-value added quality costs and the decrease the costs of defective products. Such results indicate that observation of alternations of the two-dimensional influence vector, allows determining the tendency and intensity of value added cost to the non-value added costs as well as to the added value indicators.

5 DISCUSSION AND CONCLUSION

This study adds some insights into development quality costs theory. Especially, it builds an opportunity to analyse the effect of quality costs on the added value. The completed scientific research showed that there is no uniform definition of quality costs in scientific literature. Therefore, considering the definitions of

quality costs proposed by scientists and the complexity of the added value the definition of quality costs was revealed. More specifically, it is significant impact on added value considering the 'enabling' role of quality.

Another important finding relates to proposed research framework which helps to better understand the assessment of quality costs, also to distinguish the relative importance to added value so that they can become potential sources for continuous improvement programs. The proposed research framework can contribute to the field of quality costs analysis in added value chain aspect in several ways. First, the research framework uses added value chain approach which is recognized as the dynamic system that generates the costs of interaction in the particular processes of added value chain. The research framework is based on the assumption that added value will be generated when the requirements and (or) specifications which were established by the consumers and (or) the organization will be synchronized with the processes. This will allow assuring determined level of quality through decreased non-conformance costs. Second, the assessment of quality costs in the aspect of value added chain is useful as quality costs complex assessment tool that is carried out observing the influence of the quality costs results on the value added. Considering this the assessment of quality costs from the perspective of hypothetical - deductive point of view is associated with the selection of quality costs classification method. On the basis of the expert evaluation results preventive quality costs are attributed to the group of the value added generating quality costs, whereas appraisal, internal failure and external failure quality costs are attributed to the group of the non-added value generating quality costs. The meaning of these results is substantiated not by ordinary inductive summation of quality costs categories, whereas the deduction affirms that such expansion of the quality costs categories is recognized as the extension of Lorente, Rodriguez and Rawlins (1998) theoretical results. Third, this research framework could help to perform the measurement of the added value chain quality costs influence on the value added. Moreover, described vector that reflects the added value changes could help organizations to find right quality improvement actions.

The assessment of the elements of the added value chain quality costs, their grouping into the value added generating and the value added non-generating quality costs and the revelation of their effect's trend and intensity on the value added are recognized as the biggest significance of the empirical study of this paper.

The results obtained provide valuable insights for the scientists of the business economic trends and the representatives of organizations, in order to understand the effect of quality costs on the added value. Organizations could use the list of the quality costs elements in the aspect of added value chain in order to assess the added value chain quality costs, also to compare the obtained results with the added value indicators, in order to determine quality improvement actions.

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APPENDIX

The elements of quality costs in the aspect of added value chain

Process	Quality costs	Category of quality costs PQQ, AQQ, IFQQ, EFQQ
Define the business concept and long-term vision	Competitor assessment costs	PQQ
	The economic situation analysis costs	PQQ
	The legislative analysis costs	PQQ
	New technologies accessibility evaluation costs	PQQ
	Ecology legislation analysis costs	PQQ
	Consumer requirements analysis costs	PQQ
	Process design costs	PQQ
	Stakeholder survey costs	PQQ
	Organizations characteristics analysis costs	AQQ
	Additional costs that occur because of errors in research and data analysis	IFQQ
	Incorrectly identified processes cost centres	IFQQ
Develop business strategy	The definition costs of strategic objectives and indicators	PQQ
	Responsibilities assignment costs	PQQ
	Existing situation analysis costs	AQQ
	Developed strategy evaluation costs	AQQ
	Costs incurred due to improper performance goals and objectives for defining indicators	IFQQ
Manage strategic initiatives	Strategic directions development costs	PQQ
	Strategic directions evaluation cost	AQQ
	Costs incurred for re-established strategic directions	IFQQ
Manage product and service portfolio	Market research costs	PQQ
	Customer surveys and analysis costs	PQQ
	Responsible for product planning employees salary costs	PQQ
	Additional costs that occur because of errors in planning product	IFQQ
	Costs for bad understanding of customers' needs	IFQQ
	Cost (market, sales, ...) related with incorrect product planning (affecting the subsequent processes, activities)	IFQQ
Develop products and services	In design activities involved employee training costs	PQQ
	Product prototyping costs	PQQ
	New product certification costs	PQQ
	Production process improvement costs	PQQ
	Pilot production and assembly work costs	AQQ
	Product design review costs	AQQ
	Transaction costs associated with the test product testing	AQQ
	The costs associated with repeated testing if it is needed to change product design	AQQ
	The production process quality control costs	AQQ
	Production operations testing and inspection costs	AQQ
	Costs related to the failed test products	IFQQ
	Personnel, equipment, raw materials and time costs associated with redesigning the product	IFQQ
	The product re-certification costs associated with the changing product project	IFQQ
	The costs incurred by changing raw materials purchased in connection with the project change	IFQQ
	Increased costs for downtime and delays in getting products on the draft amendment	IFQQ
	Solving with the design process quality-related problems costs	IFQQ
	Additional working hours, equipment and material costs, if the problems arise during production system verification process	IFQQ
	The costs associated with the process of re-certification of improper process design	IFQQ
	Costs related with increased production amount s in stock	IFQQ
	Compensation for customers who have suffered losses due to improper product design	EFQQ
	The costs for the customer complaints, associated with product design, solution	EFQQ
	The costs associated with returned products faults, caused by design errors and disposal	EFQQ
Understand markets, customers, and capabilities	Customers and market assessment costs	PQQ
	Market segments analysis costs	PQQ

Process	Quality costs	Category of quality costs PQQ, AQQ, IFQQ, EFQQ
	Internal and external business environment analysis costs	PQQ
	The costs of competing products research	PQQ
	Costs related to the mislabelling market opportunities, market segments identification	IFQQ
	The costs that occur because of errors in research and data analysis	IFQQ
Develop marketing and sales strategy	Marketing strategies and evaluation indicators creation cost	PQQ
	Marketing plans development costs	PQQ
	Customer loyalty and value definition costs	PQQ
	Costs associated with the incorrect naming of market segments	IFQQ
	Costs associated with the wrong product brand positioning	IFQQ
	Costs associated with the wrong product pricing	IFQQ
	Costs associated with incorrect sales channels	IFQQ
Develop and manage marketing plans	Sales forecasting costs	PQQ
	Sales strategy development costs	PQQ
	Determination of sales strategy and performance indicators costs	PQQ
	Sales opportunity analysis costs	AQQ
	Developed sales strategy evaluation costs	AQQ
	Costs incurred due to improper setting of sales objectives and performance indicators	IFQQ
	Cost related with incorrect defined value for the product for different market segments	IFQQ
	Sales budget conversion costs	IFQQ
	Losses associated with the wrong set of designed product variable costs	IFQQ
	Losses associated with the wrong specified product projected regular costs	IFQQ
	Losses associated with incorrectly calculated the projected sales revenue	IFQQ
Develop and manage sales plans	Sales plans for development costs	PQQ
	Sales plans for assessment costs	AQQ
	Sales plans correction costs	IFQQ
	Loss of missed sales channels	IFQQ
	Costs associated with incorrect information about customers	IFQQ
Plan for and acquire necessary resources (Supply Chain Planning), Procure materials and services	Raw material supply planning costs	PQQ
	Raw material supplier evaluation costs	PQQ
	Costs related to the suppliers' certification	PQQ
	Investments in the raw materials testing equipment	PQQ
	Reward employees for the raw materials inspection and testing	PQQ
	Raw material certification costs	PQQ
	Raw material inspection costs	AQQ
	Costs incurred due to procurement of raw materials evaluation and testing equipment maintenance and calibration	AQQ
	Cost of downtime, additional inventory costs, solving quality problems costs due to bad quality raw materials	IFQQ
	Raw materials purchased replacement cost, which appeared incorrectly assessed supplier	IFQQ
	The costs of raw materials due to product supply delay	IFQQ
	Costs incurred of elimination of purchased raw materials	IFQQ
	Costs incurred by replacing raw materials	IFQQ
	Costs incurred in solving problems related to the quality of purchased raw materials	IFQQ
	The costs incurred by processing products manufactured by acquiring new materials and additional inventory, related with a poor quality of purchased raw materials	IFQQ
	Additional labour costs reprocess poor quality raw materials	IFQQ
	Additional costs when poor quality materials are bought and it is an urgent need to buy another material	IFQQ
	Cost of downtime, as well as the purchase of additional inventory due to poor quality raw materials	IFQQ
	Returned products storage costs, as they were processed by using poor-quality raw materials	EFQQ
	Costs associated with rework of returned products, because of the poor quality raw materials	EFQQ
Produce/Manufacture/Deliver product	Operations quality planning costs	PQQ
	Quality assessment and control equipment design and development costs	PQQ
	Responsible for quality training costs	PQQ
	Quality Department personnel costs	PQQ
	Quality training costs	PQQ

Process	Quality costs	Category of quality costs PQQ, AQQ, IFQQ, EFQQ
	Quality improvement costs	PQQ
	Costs for the purchase of quality control measurement instruments and equipment	PQQ
	Inspection and testing instruments acquisition and maintenance costs	PQQ
	Inspection and testing costs	PQQ
	Production operations restructuration costs	PQQ
	Production operations improvement costs	PQQ
	Product quality planning costs	PQQ
	Product quality assessment, control and inspection equipment design and development costs	PQQ
	Testing or validation of equipment acquisition and maintenance costs	PQQ
	Manufacturing process validation costs	AQQ
	Quality system audit costs	AQQ
	Scheduled operations inspection, testing and audit costs	AQQ
	Product quality assessment costs	AQQ
	Process quality assessment costs	AQQ
	Maintenance and calibration costs	AQQ
	Testing and inspection data revision costs	AQQ
	Process review preparation and analysis costs	AQQ
	Acting process interference detection and fault analysis costs	AQQ
	Product quality assessment costs	AQQ
	Product inspection and functional test equipment maintenance costs	AQQ
	Costs associated with product quality control work	AQQ
	Costs associated with the maintenance and calibration work	AQQ
	Product correction actions costs	IFQQ
	Proceed correction actions costs	IFQQ
	The costs incurred in taking operation correction actions	IFQQ
	Re-process / operation inspection / testing costs	IFQQ
	The costs, when you need to pay for additional working hours, managing non-conformance product that was identified during the process	IFQQ
	Costs of raw materials and equipment needed for the improving process, resulting non-conformance product	IFQQ
	Costs of additional worked hours and used raw materials, which arose due to improper destruction of controlled process produced non-conformance product	IFQQ
	Cost of downtime, as well as the purchase costs of additional inventory in order to improve the process	IFQQ
	Costs that arose to eliminate deficiencies in the quality control system	IFQQ
	Costs incurred due to the of non-compliant quality orders	IFQQ
	Costs resulting from a delay in time to comply with the order	IFQQ
	Costs for the removal of defects after finished product inspection	IFQQ
	Troubleshooting or improper process analysis (cost when a product is made)	IFQQ
	Non-conformance product costs	IFQQ
	Manufactured products re-process or repair costs	IFQQ
	Re-inspection / testing costs	IFQQ
	Costs for additional working hours of the accumulation non-conformance products	IFQQ
	Costs of materials needed for the re-processing accumulated non-conformance products	IFQQ
	Costs arising from the treatment and repair of returned products that have been properly checked after production	IFQQ
	Costs related with rising returned non-conformance products in stock, which was not properly checked after production	IFQQ
	Costs arising from the delay deliver product to the market, which is due to poorly carried out final inspection	IFQQ
	Additional costs due to improper final product inspection and testing (e.g. .: fine)	IFQQ
	Ecology legislation noncompliance fine	IFQQ
Deliver service to customer	Specific manufacturing requirements for individual customer design costs	PQQ
	Individual customer manufacturing services planning costs	PQQ
	Individual production of raw materials distribution plan deliver costs	PQQ
	Costs of customers feedback survey on the provided service	PQQ
	Manufacturing services quality assurance costs	AQQ
	Losses associated with individual service planning	IFQQ
	Losses associated with incorrectly prepared materials distribution plan	IFQQ

Process	Quality costs	Category of quality costs PQQ, AQQ, IFQQ, EFQQ
	Non-conformance production service costs	IFQQ
	Production services non-conformance identification costs	IFQQ
Manage logistics and warehousing	Responsible for sales /logistics staff training costs, conveying knowledge about the product	PQQ
	Operating instructions for users delivering costs	PQQ
	Protective product packaging costs	PQQ
	Special equipment for the transportation of the product acquisition and maintenance costs	PQQ
	Cargo insurance costs	PQQ
	Product inventory and spare parts analysis cost	AQQ
	Costs associated with the wrong transportation schedule preparation	IFQQ
	Repeated delivery costs for the during delivery upraised errors	IFQQ
	Costs incurred as a result of pricing uncertainty or error	IFQQ
	Costs associated with returned products storage	IFQQ
	Transportation costs of returned products	EFQQ
	The costs associated with defective orders	EFQQ
	Costs incurred due to incorrect product delivery	EFQQ
	Costs incurred by replacing the product or spare part	EFQQ
Develop customer care/customer service strategy	Consumer service strategy design costs	PQQ
	Costs related to the analysis of existing customers	PQQ
	Provided after sell service quality level identification costs	PQQ
	Costs related to consumer feedback data analysis	AQQ
	Costs associated with the wrong set of consumer segments	IFQQ
	Costs associated with the incorrectly identified after sell services	IFQQ
Plan and manage customer service operations	Supporting service quality cost	PQQ
	Customer service improvement costs	PQQ
	Customer service centre costs	AQQ
	Costs incurred due to inadequate communication with the customer	EFQQ
	Costs related to customer dissatisfaction	EFQQ
	Compensation to consumers for delivered non-conformance product or (and) provided non-conformance after sell services	EFQQ
	Orders related with after-sales services faults cancellation costs	EFQQ
	Extra working hours and additional materials costs related with non-conformance after sell service	EFQQ
	Customer loyalty loss costs	EFQQ
	Cost of the loss of the organization's image	EFQQ
	Costs of loss of market share	EFQQ
	Costs related to the product label loss	EFQQ
	Costs that occur in the processing and repairing returned non-conformance product	EFQQ
	Warranty claims costs	EFQQ
	Warranty repair costs	EFQQ
	Fines paid for customers related with damage/injury caused by non-conformance products	EFQQ
Measure and evaluate customer service operations	Customer satisfaction survey costs	PQQ
	Costs associated with identification of quality improvement decisions	PQQ
	Consumer complaints analysis and decision-making costs	EFQQ

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A Matrix of the Functions and Organizations that Ensure Continued Healthcare Services in a Disaster

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ABSTRACT

Purpose: Japan is one of the most natural disaster-prone countries in the world. In the case of a natural disaster or mass casualty incident, a large number of injured people are likely to go to hospitals, which need to provide more services at such times. Thus, it is necessary for various bodies – such as hospitals, municipalities, medical associations, pharmaceutical associations, and trade associations – to collaborate. For example, coordination among multiple hospitals is important when transporting patients to another hospital if they cannot be examined at the first one.

There is a pressing need to establish an Area Disaster Resilience Management System for Healthcare (ADRMS-H) to increase medical resilience. In order to develop an ADRMS-H and ensure that continuous healthcare is provided during calamities, it is necessary to clarify the functions (which we have already explained) and coordination that organizations must perform. Since medical care needs change by the hour during disasters, so do the functions that guarantee ongoing healthcare. This study aims to create a matrix of functions ensuring continued healthcare services in a disaster and relevant organizations to understand each one's role and how they relate to each other.

Methodology/Approach: We used the case of Kawaguchi city in Saitama Prefecture, Japan as an example to illustrate related organizations needed to fulfill the functions for ensuring continued healthcare services. Next, we created a matrix of the functions and organizations.

Findings: This study identified related organizations such as municipalities, hospitals, medical associations, and trade associations in Kawaguchi city. Since functions for ensuring ongoing healthcare change by the hour, so do the organizations, whose transformations we analyzed by the hour.

Originality/Value of paper: The results of this paper can help people understand how related organizations work together during disasters; in light of this, it will be possible to develop a model for an ADRMS-H in terms of coordination among organizations.

Category: Research paper

Keywords: Disaster medicine; Resilience; Area Disaster Resilience Management System for Healthcare (ADRMS-H); Coordination; Area

1 INTRODUCTION

Japan is one of the most natural disaster-prone countries in the world and is especially vulnerable to large earthquakes. The continuation and restoration of business is very important in such circumstances. In particular, the inability to provide healthcare services has a severe impact on disaster areas. Many injured persons are likely to come to hospitals during natural disasters or mass casualty incidents, requiring the hospitals to provide increased healthcare services. Therefore, a medical care system must be established that can provide continuous healthcare services in a disaster.

Business Continuity Planning (BCP) aims to ensure business continuity in the face of disaster risk (ISO, 2012; Japan Institute for Promotion of Digital Economy and Community, 2013; Japanese Standards Association, 2013). Business continuity management systems (BCMSs) are increasingly being implemented to maintain, perform, and improve BCP (ISO, 2012; Japan Institute for Promotion of Digital Economy and Community, 2013; Japanese Standards Association, 2013).

During natural disasters or mass casualty incidents, hospitals must continue to provide not only healthcare services to the regular inpatients and outpatients but also medical treatment to many injured. Thus, hospitals must balance general medical treatment with disaster medicine, a burden other businesses do not have. Furthermore, medical care needs in a disaster change by the hour.

Creating a BCP in a single organization is not enough to deal with the needs in a disaster and ensure the provision of healthcare services. Disaster medicine requires the coordination of more than one hospital, as well as the municipality, medical associations, pharmaceutical associations, trade associations, and other agencies. Healthcare services cannot be provided efficiently without the cooperation of many organizations. Two examples illustrate how coordination ensures continued healthcare services:

- Coordination between multiple hospitals is important when transporting patients to another hospital if they cannot be examined at the first.

- Inaccessible roads during a disaster make it difficult to supply medical devices and medication. Therefore, coordination between hospitals and the suppliers of pharmaceuticals and medical devices is necessary.

In order to continue the provision of healthcare services with the cooperation of many organizations, there is a pressing need to establish an Area Disaster Resilience Management System for Healthcare (ADRMS-H) to increase medical resilience.

Organizations' functions and coordination must be clarified to develop an ADRMS-H and ensure the continuity of healthcare during calamities. Since medical care needs change by the hour during disasters, so do the functions that guarantee ongoing healthcare. This study creates a matrix of the functions and organizations that ensure continued healthcare services in a disaster to understand their roles and how they relate to each other. We use the case of Kawaguchi city, Saitama prefecture, Japan, as an example.

2 PREVIOUS STUDIES

2.1 Business Continuity Plans (BCP) and Business Continuity Management System (BCMS)

BCP is a documented procedure that enables an organization to respond to a disruptive incident and deal appropriately with the resumption and recovery of its activities. BCP includes procedures related to establishing refuges, rescuing injured persons, establishing rescue procedures, collecting information, and so on. Risks covered by the BCP include natural disasters, pandemics, computer viruses, and similar crises. A BCP is a documented procedure that enables the resumption and recovery of activities in the event of any of the aforementioned risks.

There is no guarantee that frequent improvements will result in an ideal BCP. Dynamic social, economic, and business environments, as well as the probability that a natural disaster will occur, change over time; thus, the importance of establishing a BCMS to maintain, perform, and improve BCP has recently been acknowledged.

Although ISO 22301, which defines BCMS requirements, was published in 2012, it is generic and, as such, is intended to apply to all business types. Thus, it is difficult simply to apply ISO 22301 to healthcare services as well.

Moreover, a BCP and BCMS need to be applied to a single organization. In order to continue the provision of healthcare services, the BCP and BCMS need to be applied in a single area, such as a city. In other words, it will be necessary to establish an ADRMS-H to increase medical resilience. However, an ADRMS-H model has not yet been clarified.

2.2 Medical management and support system

Kajihara et al. (2014) have identified the functions needed to ensure continued healthcare services during the three days immediately after a large earthquake. They have also created both a diagram illustrating the coordination between organizations needed to fulfill the functions and a matrix of those functions and related organizations. However, their discussion is limited to the first three days after an earthquake. The functions required to ensure continued healthcare services change by the hour because the needs of medical care in a disaster change by the hour. Therefore, it is necessary to clarify the functions and matrix for a week or month after an earthquake, based on the changing needs.

Watanabe, et al. (2007) have proposed a medical management and support system for disasters in Shiga prefecture divided into three phases:

- First phase, within three hours after the outbreak of disaster: Emergency medical teams are dispatched to the disaster site in order to collect and report firsthand information in close coordination and cooperation with both ambulance and police personnel.
- Second phase, from three hours to three days after the outbreak of disaster: The emergency medical team triages and treats the injured and then transports seriously injured persons rapidly and systematically to key disaster hospitals.
- Third phase, three days after the outbreak of disaster: Medical and health management along with support systems should be provided for the medical and psychological care of the injured.

The Bureau of Social Welfare and Public Health, Tokyo Metropolitan Government (Bureau of Social Welfare and Public Health, 2015) has divided disaster response into six hourly phases, and both the medical care needs and the medical activities that hospitals should provide in each phase have been clarified.

Thus, Watanabe et al. and the Tokyo Metropolitan Government have divided the phases according to the time elapsed after a disaster, but response times will differ depending on the disaster's scale.

3 CLARIFYING THE ROLE OF ORGANIZATIONS IN ENSURING CONTINUOUS HEALTHCARE SERVICES PROVISION DURING A DISASTER

3.1 The functions of each phase in ensuring continued healthcare services

Kajihara, et al. (2015) have analyzed the changes in both healthcare services and medical management and support systems, dividing the phases into four sections to discuss the changes in the functions needed to ensure ongoing healthcare by the hour. The results of these considerations are shown in Table 1.

Table 1 – Changes in both healthcare services and medical management and support systems

	Phase 1	Phase 2	Phase 3	Phase 4
Changes in provided healthcare services	・Lifesaving ・First aid at stricken area	・Emergency and critical care to injured persons − Transport seriously-injured persons to non-disaster areas ・Autopsy ・Support for assisted persons - Patients receiving dialysis - Ventilated patients, etc.	・Continue to treat the injured ・Continue to provide support for assisted persons ・Treat for chronic diseases - Prescribe medicine ・Treat persons with mental disorders	・Continue to treat persons with mental disorders ・Receive patients who are then transported to other areas
Changes in medical management and support systems	(Hospitals in disaster area) ・Deal with treatment using only staff in hospitals (Disaster-stricken area) ・Lifesaving with one's fellow residents ・Fire fighters and police officers are dispatched to the disaster site for lifesaving purposes	・Receive resources from non-stricken area - Disaster Medical Assistance Team (DMAT) - Medicine - Equipment ・Request to accept emergency patients	・Request for support from Red Cross and neighboring clinics ・DMAT withdraws from disaster stricken area	・Red Cross withdraws from disaster stricken area ・Suppliers are restored

Next, Kajihara, et al. (2015) considered the functions organizations must perform in each phase to ensure continued healthcare services in a disaster within the limits of the medical management and support system shown in Table 1. They referred to several records of and guidelines based on the Great East Japan Earthquake. The functions of phases 2 and 3 are shown in Figures 1 and 2 as an example.

A detailed explanation of Figure 1 will serve as an example. In Figure 1, the arrows indicate the relocation of patients, dead bodies, and medical staff. The required functions are shown from (1) to (8). Triage—determining the priority of treatment depending on the severity of a patient's condition—is very important; seriously injured patients need to be transported quickly to key disaster hospitals. Functions (1) through (4) are triage, treatment, and transportation. Ensuring continued treatment requires that organizations (5) provide resources, (6) manage the bodies of the deceased, (7) support assisted persons, and (8) inform residents about medical relief. The functions of other phases were similarly identified.

3.2 A matrix of the functions and organizations

Figure 1 shows the functions of phase 2, and Figure 2 shows the functions of phase 3.

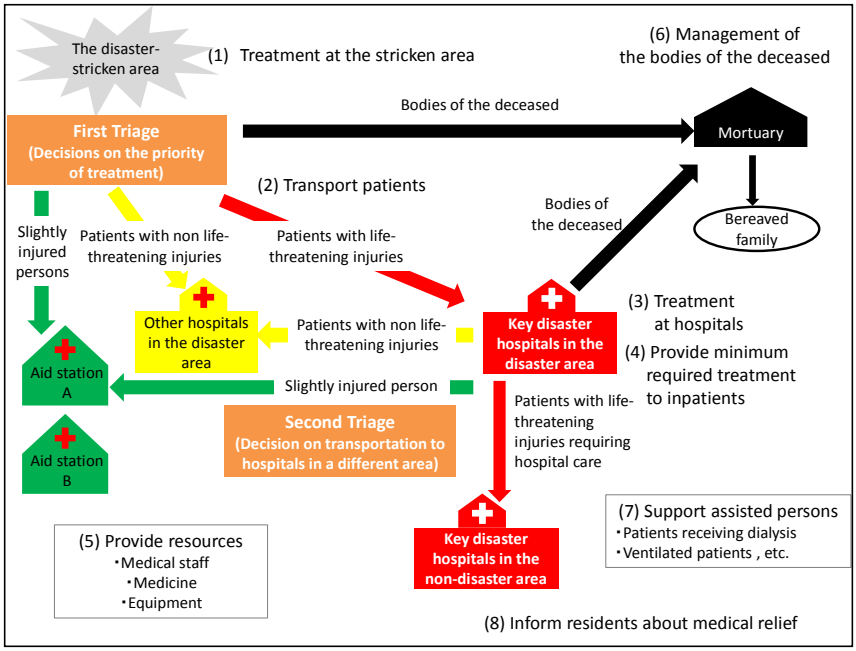

Figure 1 – The functions of phase 2

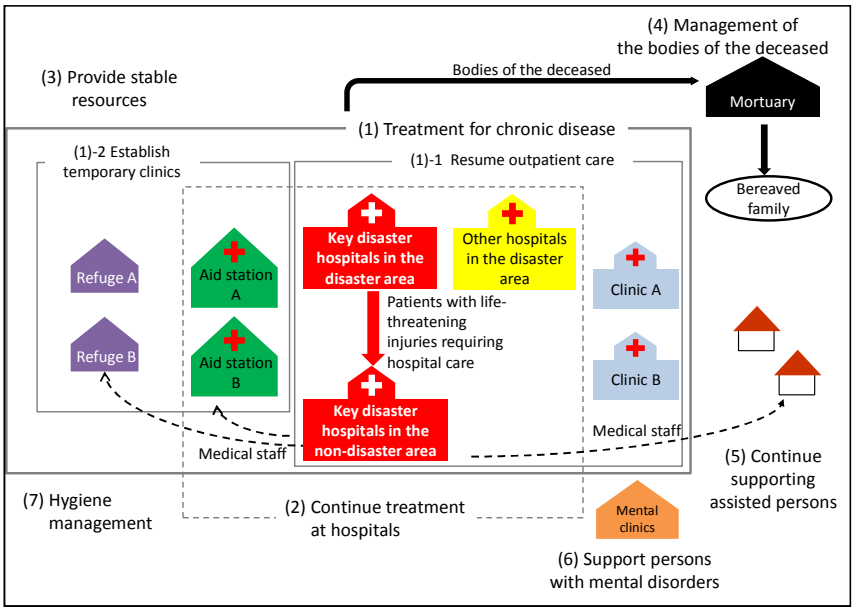

Figure 2 – The functions of phase 3

However, the functions and coordination have not been clarified in detail, making it difficult to identify the roles of the related organizations. Several investigations were conducted on both the detailed functions and the organizations needed to fulfill them.

First, we investigated the records of the Great East Japan Earthquake to understand what the municipality and hospitals did during the event. Next, we investigated several cities' regional disaster prevention plans, which delineate disaster action plans for municipalities, hospitals, fire brigades, and residents. We investigated the plans of several cities because one city's plan may omit necessary functions. Prefectures and cities in the disaster-stricken area released records on the earthquakes and the regional disaster prevention plans on their websites, which we examined. We identified the roles of each organization (e.g., municipalities, hospitals) using the records and then examined the coordination needed among them to provide effective healthcare services.

We also interviewed two doctors who provided healthcare services at hospitals during the Great East Japan and Great Hanshin/Awaji Earthquakes. We conducted a cooperative study involving 10 hospitals over about 10 years. We asked the doctors of the hospitals to participate in the interview. The interview items included when, where, and how healthcare services were provided during each earthquake.

Through these investigations, we developed the functions shown in Figures 1 and 2 in more detail to clarify them.

We used the case of Kawaguchi city as an example to illustrate how organizations needed to fulfill the functions outlined in Figures 1 and 2. Here, a pivotal key disaster hospital, referred to as Hospital A, provides healthcare services during the disaster. Although Hospital A and the Kawaguchi City office perform important roles, they cannot implement all functions on their own. Therefore, we examined the organizations and traders with whom Hospital A and the Kawaguchi City office concluded agreements for disaster assistance and regarded these organizations and traders as related organizations needed to fulfill various functions.

We then created a matrix outlining the detailed functions and related organizations. The functions performed by each organization were considered by referring to the regional disaster prevention plan of Kawaguchi City, and the correspondence between organizations was included. The regional disaster prevention plan of Kawaguchi city does not include all functions because the organizations in charge of some of the functions have not been decided yet; these functions were left blank in the matrix. The coordination type shown in the matrix is indicated by the marks. These types include a chain of command, a chain of communication between organizations, a chain of demand on other organizations, and a supply of staff and medication. Parts of the matrices of phases 2 and 3 are shown in Tables 2 and 3 as examples.

Table 2 – The matrix of phase 2

【The organization in Charge】◎, 【A chain of communication】△ : from, ▲ : to, 【A chain of demand】○ : from, ● : to

Functions	Detailed Functions		Kawaguchi City Office				Hospitals				...
			In charge of unification and information gathering			...	Key disaster hospitals in Kawaguchi city		Key disaster hospitals in non-disaster areas	DMAT	...
	First Hierarchy	Second Hierarchy	Headquarters Chairman	Information gathering section	Fire fighting section	...	Hospital A	Hospital B			
(1) Treatment at the Disaster Area	(1)-1 Gather the information on damages	Grasp the number of injured persons in target city		◎							
		Grasp the situation in relation to damages to hospitals and clinics etc.		△			▲	▲	▲		
		Grasp the traffic conditions									
	...	...									
	(1)-4 Provide treatment	Implement first triage								◎	
		Take temporary measures								◎	
		Confirm amount of dead								◎	
(2) Treatment at Hospitals	(2)-1 Treatment at key disaster hospitals in the disaster area	Implement second triage					◎	◎			
		Receive DMAT (Disaster Medical Assistant Team)					◎	◎			
	(2)-2 Demand admission of patients needing hospital care at other hospitals	Look for other hospitals to take patients									
		Demand admission of patients							●	○	
	...	...									
(3) Transport Patients	(3)-1 Establish Stage Care Unit (SCU)	Decide places for the establishment of SCU									
		Provide resources to SCU									
		Establish SCU									
	(3)-2 Secure a means of	Demand ambulances	□		■						
		Demand police cooperation	○								
	...	...									
...	...	...									

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Table 3 – The matrix of phase 3

【The organization in Charge】◎, 【A chain of communication】△: from, ▲: to, 【A chain of demand】○: from, ●: to

Functions	Detailed Functions		Kawaguchi City Office				Hospitals			DMAT	The Japan Dietetic Association	…
			In charge of unification and information gathering			…	Key disaster hospitals in Kawaguchi city		Key disaster hospitals in non-disaster areas			…
	First Hierarchy	Second Hierarchy	Headquarters Chairman	Information gathering section	Fire-fighting section	…	Hospital A	Hospital B				
(1)-1 Resume outpatient care	(1)-1-1 Gather the information	Grasp the needs of healthcare										
		Grasp the situation in relation to damages										
		Confirm the conditions of electricity, gas, etc.										
		Grasp the conditions of staff										
	(1)-1-2 Establish medical system	Personal distribution					◎	◎				
		Provide resources					○	○				
		Establish a system of prescription					◎	◎				
	(1)-1-3 Provide medical care	Examine patients					◎	◎				
		Medical examination					◎	◎				
		Medication					◎	◎				
(1)-2 Establish temporary clinics	(1)-2-1 Establish main aid stations	Determine locations of main aid stations										
		Establish aid stations	◎		◎							
	(1)-2-2 Provide treatment at aid stations	Manage the disaster relief teams										
		Assess the aid stations and refuge										
		Assign the relief teams										
		Provide treatment										
		Provide the information to next teams										
	…											
…	…	…										
(6) Support persons with mental disorders	(6)-1 Gather the information	Grasp the situation in relation to damages to mental clinics										
	(6)-2 Establish aid stations for persons with mental disorders	Determine locations of aid stations	◎									
		Establish aid stations	◎									
	…	…										
(7) Hygiene management	(7)-1 Assessment	Assess the refuge										
	(7)-2 Provide food	Provide food, water, etc. periodically										
		Food sanitation									◎	
	(7)-3 Solve the problems	Establish hand-washing facilities	◎									
		Establish provisional toilets	◎									
		Provide masks	◎									
		Nutrition education	◎								◎	
	…	…										

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3.3 Using the matrix

We linked the organizations to detailed functions by referring to Kawaguchi City's regional disaster prevention plan, as shown in Tables 2 and 3. As the plan does not include all functions (as mentioned), organizations will need to be placed in charge of all remaining functions, and the regional disaster prevention plan will need to be revised. The functions without organizations in charge can be identified from the matrix, enabling the revision of the disaster prevention plan and the preparation of procedure manuals.

Table 2 is the matrix of phase 2, and Table 3 is the matrix of phase 3. Creating the matrix of each phase enables us to grasp the changing roles of each organization by the hour. Disaster-stricken areas are confusing places, and disaster manuals that deal with organizations' changing roles must be available; this will allow hospitals to provide healthcare services effectively and efficiently.

4 DISCUSSION

Many injured may arrive at hospitals during natural disasters or mass casualty incidents, which can overwhelm them and deplete medical equipment amid the confusion. Taking immediate action is difficult without an appropriate disaster plan. Negotiating an agreement for coordinating with related organizations and keeping channels of communication open is particularly important. The matrix proposed in this study enable the development of a BCP that considers coordination among organizations, thus facilitating cooperation among them and ensuring the continuity of healthcare services.

During disasters, organizations have little opportunity to communicate because the grounds for discussion are sometimes lacking. This study's matrix is intended to promote communication among related organizations and improve cooperation between hospitals and clinics by clarifying the coordination needed among all of them.

5 CONCLUSION AND FUTURE ISSUES

This study has clarified the functions organizations must perform in each phase to ensure continuity in healthcare services during a disaster in detail. We have also clarified the role of each organization using a matrix illustrating the coordination needed among organizations. It is possible to grasp the roles and the coordination of each phase through the matrix.

A future study will develop the ADRMS-H based on the results of this research.

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Continuous Quality Improvement as a Central Tenet of TQM: History and Current Status

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ABSTRACT

Purpose: The great promise of continual quality improvement advocated by early quality gurus like Deming and Juran has not been fully realized. This paper explores the reasons for the limited success of implementation and institutionalization of continuous quality improvement.

Approach: About 100 quality professionals from diverse organizations answered questions related to this study. Additionally, the authors executed a wide-ranging literature search including the use of Google Scholar.

Findings: Nearly all quality professionals queried in this study agree that compliance to an external quality standard such as ISO is mandatory for their organizations. However, there is disagreement as to whether or not compliance with the continuous improvement proviso in most quality standards is actually implemented and functioning.

Research limitations/implications: The sample size is small and there is a need for a larger universe of quality professionals, registration/standards organizations, and academic researchers.

Practical implications: Many organizations from a broad array of economic sectors both public and private must comply with external quality standards. Most external quality standards contain a requirement for evidence of continuous improvement. However, the potential for improvement associated with compliance is frequently not realized.

Originality/value: Continuous quality improvement is central to many quality standards including ISO 9001. Unfortunately, many ISO compliant organizations are unable to operationalize and sustain the process of continual improvement. This paper provides a novel examination of this problem and suggests ways that organizations can leverage the potential for improvement via their existing quality systems.

Category: Research paper

Keywords: quality improvement; TQM; continuous improvement; ISO; audit

1 INTRODUCTION

Since the prehistoric beginnings of human material culture, craft production has exhibited bona fide processes of quality control. A unique physical object is usually made and inspected by the same person. Aesthetic and utilitarian values of the individual article are achieved by variation imparted by the maker; whether art or craft, the process is the same. This history is well reviewed by Shewhart (1986) and Juran (1995). By the late 1800s, a new form of production emerged first in Europe and then in the US: mass production. A key element of mass production was the "scientific" approach to work including differentiation of labor by skill level advocated and successfully implemented by Frederick Taylor (Taylor, 1914; Locke, 1982). Quality was removed from the auspices of the maker and assigned to the inspection or quality department. The genius of Henry Ford and early mass producers of the late 19th and early 20th centuries was to realize the productivity advantages implicit in the separation of set-up, production, and inspection/checking. While the actual link between Ford and Taylor is tenuous, mass production of automobiles used division of labor techniques pioneered by Taylor, the father of industrial engineering (Locke, 1982). Ford was quoted as stating that mass production had been achieved when the production system employed no "fitters" (Hounshell, 1985). That is, the individual industrial processes making a part were set up by skilled workers and checked, usually via attribute gages, at the point of manufacture. The unskilled/semi-skilled worker simply installed the part with the (usually correct) assumption that the part had already passed an inspection and was correct. The installer did not have to "fit" or adjust/modify the part when she/he found that it did not fit as originally manufactured. While the English term "fitter" for an unskilled worker has persisted, especially in the U.K., the function has been disappearing for over a hundred years. In conventional mass production, final inspection was done by a separate quality inspector. When mass production (sans fitters) of automobiles was achieved by Ford before World War One, direct labor was reduced by 90%, retail price dropped dramatically, and the automobile became "The Machine That Change the World" (Womack, Jones and Roos, 2008) at least partially due to its relatively cheap retail price achieved by Ford's economies of scale and division of labor making possible the moving assembly line.

The Ford/Taylor system was enormously productive but difficult to change over from one product to another. The moving assembly line was very expensive to keep going and stoppages meant that costly workers and machines were idle. On time delivery of quality parts to the line was essential. The consistent dimensional control in Ford's mass production was achieved by highly skilled workers executing the machine set-up, and the effective use of attribute gages

first developed for other precision industries such as armaments and sewing machines (Hounshell, 1985). Still, the only functional strategy for inspection was to gage each part and stop the process when a critical dimension was found to be out of specification. While this sequence was much more efficient than the installer "fitting" the part, one hundred percent inspection was still fairly labor intensive.

Working with Bell Laboratories, the research and development arm of the US national telephone company, Walter Shewhart initiated the use of statistical process control to inspect by sampling rather than one hundred percent inspection (Shewhart, 1924; 1931). "The year 1924—at a factory in Cicero, Illinois—saw the start of two of the most important developments ever in managerial thinking. In May that year Walter Shewhart described the first control chart which launched statistical process control and quality improvement." (Best and Neuhauser, 2006). His 1931 book title, Economic Control of Quality of Manufactured Product says it all. Shewhart's key achievement was not quality control per se, but economic quality control and improvement was generally limited to the cost savings associated with higher process yields and fewer bad parts.

Ford's moving assembly line combined with Shewhart's statistical methods of quality control contributed mightily to the creation of Detroit as "The Arsenal of Democracy" during World War Two and the subsequent rise and dominance of US manufacturing in the three decades immediately following the war. What must be said about the rise of US manufacturing from the end of World War Two and the mid-1970s was that this success was achieved in an economic environment almost completely devoid of competition. The "Detroit Big Three" automakers controlled over 90% of the car market with defects averaging 22 per vehicle. However, change was coming, especially from an unexpected recently defeated enemy – Japan. With some assistance from foreigners such as Deming and Juran, the Japanese post-war miracle incorporated Shewhart's statistical methods appended to existing production systems based on scarcity – scarcity of capital, raw materials, markets, technology, and labor (Womack, Jones and Roos, 2008). Oil price increases in the early 1970s drew American buyers into the showrooms of Japanese producers with small, high quality cars with good fuel economy. By the late 1970s one of three cars sold in the US was a Japanese car made in Japan. In trend-setting California, the Japanese market share was over 50% (Womack, Jones and Roos, 2008). The US government, acting to protect domestic car producers, negotiated the Voluntary Restraint Act (VRA) of 1981 with Japan (United States International Trade Commission, 1985).

By limiting the import of Japanese autos and protecting domestic producers, the American VRA tacitly acknowledged the superiority of Japanese manufacturing methods and ushered in the modern US era of "improvement" not just of product quality, but of all industrial and business processes. This era was heralded with the famous broadcast of "If Japan Can, Why Can't We" by Dr. W. Edwards Deming (Samson and Terziovski, 1999). Deming's assertions were not new;

Peter Drucker (1971) and others had been touting the advantages of Japanese management for years. The authors of this paper assert that the change from quality "control" (as per Shewhart) to continuous improvement (as per Toyota) began with the widespread study of Japanese manufacturing including the work of Ishikawa (1985), Shingo (1985, 1986, 1989), Ohno (1982, 1988), Kano (1995, 2001), Taguchi (1986) and others by Americans and Europeans. Sasaki and Hutchins (2014) and Hutchins (2012) document this period very well. Additionally, the International Motor Vehicle Project (IMVP) at the Massachusetts Institute of Technology (MIT) initiated the Assembly Plant Study (Krafcik, 1988; MacDuffie and Krafcik, 1992), introducing the term "lean" production describing the Toyota Production System, widely acknowledged as the paragon of Continuous Improvement (CI) practice. No more needs to be said about the ongoing importance of lean production since its introduction to the West in the 1980s via publications emanating from the IMVP and the popular book The Machine That Changed the World hitting the market in 1990.

In the 1980s continuous improvement using "lean" strategies was widely accepted and Deming was considered as the apotheosis of quality (some 121 scholarly articles on Deming published between 1994 (he died in 1993) and 2006) (Knouse, et al., 2009). The "Shewhart" cycle was introduced as early as 1931, and Deming's 14 principles included Principle 5: Improve constantly and forever the system (Deming, 1986; Knouse, et al., 2009; Zairi, 2013). Juran (1988) proposed his "Trilogy" of quality planning, control and improvement in an endless loop. ISO 9000, was first published in 1987 (Goldman, 2005). According to Goldman (2005), "ISO 9000 is a universal, quality assurance (not quality "control") management system." By 1990 or so, the lean/Toyota system, quality gurus, and ISO 9000 were consistent in their support of continuous improvement.

2 TOTAL QUALITY MANAGEMENT, CONTINUOUS IMPROVEMENT, AND COMPLIANCE TO EXTERNAL STANDARDS

Popular labels such as "Total Quality Management" (TQM), "Total Quality" and Quality Management (QM) became prevalent in academic and popular business literature without canonical definitions. However Sun (2000), Hendricks and Singhal (1997) and many others consider continuous improvement to be an essential component of TQM. ISO 9000 remains globally important. On June 10, 2015 the yields of Google searches were as follows: Google Scholar searches yielded: ISO 9000-347,000, ISO 9001-88,000, ISO 9000 and continuous improvement- 43,100, continuous improvement- 3,910,000. Google Searches yielded: ISO 9000-15,300,000, ISO 9001-104,000,000, ISO 9000 and continuous improvement- 1,360,000, continuous improvement- 28,400,000.

Survival in many economic sectors is tied to registration to an ISO based standard. For example, the ISO-based TS 16949 establishes quality system requirements for most of the automotive supply chains in North America and elsewhere (AIAG, 2013). At the international level: "there seems to be an apparent positive relationship between the number of ISO 9001 certificates per 1000 inhabitants and the levels of economic development reached in different countries" (Sampaio, Saraiva and Guimarães Rodrigues, 2009). Earning registration to external quality standards is essential for many companies, important to many more, and may be tied to the economic success of companies and nations. The number of registered companies is growing worldwide.

ISO 9001:2015 Section 10 requires continuous improvement and the Plan-Do-Check-Act (PDCA) for the continuous improvement of processes. Does compliance to Section 10 lead to improvement of internal processes? Poksinska, Dahlgaard and Antoni (2002) cited by Sampaio, Saraiva and Guimarães Rodrigues (2009) concluded that companies "…maximize their benefits if they achieve ISO 9001 certification based on internal motivations." These "internal" motivations for ISO registration are those associated with continuously improving productivity, quality, customer satisfaction etc. One well known system for improving internal processes is the Toyota Production System (TPS) lean model of continuous improvement (Womack, Jones and Roos, 2008). The lean model incorporates tactics such as kaizen or continuous improvement teams and high levels of employee involvement in improvement suggestion systems. The authors posit that registration to an external quality standard is more likely to yield positive improvement results if the company's internal motivation for such registration is made manifest via ongoing internal continuous improvement efforts that engage all levels of employees (Booker and Tucker, 2015).

What happens when ISO 9001 is implemented? Evidence is equivocal as to the benefits of ISO 9001 registration (Naveh, Marcus and Moon, 2004; Naveh and Marcus, 2004; Sampaio, Saraiva and Guimarães Rodrigues, 2009). While the relation between ISO 9000 registration and business success is not settled, there is clearly a perceived benefit of registration as necessity for compliance with customer requirements. As mentioned previously, compliance to ISO 9001:2015 Section 10 requires documentation of continuous improvement. However, the "lip service" given to continuous improvement in a compliance audits is pervasive. There is a general belief among practitioners that managers view compliance as a cost, not an opportunity for improvement (Booker and Tucker, 2015). "When firms simply react to external pressures for getting certified, they may face ISO 9001 registration as a prime objective of itself, adopt a minimalist approach to achieve it, and thus achieve limited internal performance improvements." (Sampaio, Saraiva and Guimarães Rodrigues, 2009, p.48). And, it is common that when a large and geographically dispersed company is compliant to an external standard, many employees are not even aware of the quality standard and its requirements (Teehan and Tucker, 2014).

3 WHAT HAPPENED TO CONTINUOUS IMPROVEMENT?

As has been articulated previously in this paper, continuous improvement has been a basic principle of the quality movement since the beginnings of the modern era in the 1980s. Kaizen, with its origins in the Toyota Production System, has been institutionalized as a means of business survival. A Google search done on June 15, 2015 yields over 13,000,000 "hits" for kaizen. The most important global standard for quality, the ISO 9000 series, "mandates" continuous improvement. Yet, there is widespread support in the literature for the idea that continuous improvement is often lacking even in quality systems registered to external standards such as ISO. "Our results show that the impact of internal organizational processes that are based on ISO 9000 principles on operating performance is not significant." (Singh, Power and Chuong, 2011, p. 31). Whereas ISO is seen as a means of detecting nonconformance and facilitating trade, it has been judged to lack the improvement component present in other standards such as the Baldrige Award. "Perhaps a winning strategy could be to try to integrate more fully in their efforts to seek certification, important Baldrige criteria strategies such as customer-focus, continuous improvement, and competitiveness through improved overall performance." (Kartha, 2004, p.339).

The pharmaceutical industry in the US is highly regulated by the US Food and Drug Administration (FDA). Speaking of that industry, Breggar, 2009 suggests "that overall quality of product is improved through this focus on prevention rather than detection. Even in these more proactive environments, however, there is still an assumption the compliance is a "cost of doing business", impacting the culture of the organization." (Breggar, 2009; p.10). The title of Breggar's article: "How to Shift from Reactive Compliance to Strategic Quality Management" is a rare instance in the literature of suggesting how to leverage the need for compliance into real, sustainable improvement. It is interesting to note that Breggar is a practitioner, not an academic researcher. As will be seen, this is a common thread in practitioners' view: how can complying with the mandatory external standard be extended or converted into a system of continuous improvement?

4 DATA COLLECTION AND ANALYSIS

Some 100 quality professionals participated in a survey accessed (anonymously) via online graduate classes. Participants were almost entirely mid-career professionals from a variety of economic sectors including: retail, automotive, health care, medical device, military, information technology, quality system auditor/registrar, insurance, home appliance manufacture, and pharmaceutical. Their responses were organized into short synopses. Data was collected over a two year period, 2014 and 2015, and from 6 different online classes. The authors employed simple textual analysis as per Fairclough, (2003) to create synopses for the survey responses. In the survey responses, common words, phrases, and

concepts were amalgamated into two or three sentence synopses for each question.

Participant practitioners were asked the question: Throughout this course there is an underlying theme that quality systems involve compliance to some quality system external standard such as ISO, TS, or FDA (or internal such as TPS). And, many of these internal or external standards "mandate" continuous improvement. Based on your experience (and please indicate which industry/economic sector in which you have work experience), how do compliance and improvement relate?

The authors used textual analysis via two strategies: (1) word searches were employed to identify commonly used words in the synopses and (2) the synopses were scrutinized for common phrases not easily identified by the literal word searches. Tabulations of these words and phrases yielded some overarching themes from the responses. These are:

1) Compliance to an external quality standard is almost always a response to demands by government or customers.
2) Compliance is generally viewed as a "necessary evil" to stay in business but only infrequently includes CI efforts.
3) Compliance is useful in preventing non-conformances in products and services.
4) While continuous improvement (CI) may be "mandated" in the standard such as ISO 9000 series and TS 16949, it is rare that an external audit approval will actually be jeopardized by weak or absent CI procedures or documentation.
5) "Potemkin Village" CI is common to pass the audit. That is, a temporary CI effort will be made to show to the auditor, but the CI team is not given a critical problem to solve or continued after registration is achieved.
6) Quality professionals have great faith in the advantages of institutionalized CI but are often prevented by their managers from allocating resources to actually implement permanent CI.
7) Compliance is particularly onerous and demanding with direct government oversight and auditing leaving little or no time for improvement.
8) A small number of "best practice" firms are thoroughly imbued with CI at all levels.
9) It appears that the higher the level of competition in companies registered to an external quality standard, the more likely that CI will be employed albeit in a sporadic, non-institutionalized manner.

5 CONCLUSION

Nearly all quality professionals queried in this study agree that compliance to an external quality standard such as ISO is mandatory for their organizations. However, there is a wide range of opinions as to whether or not compliance with the continuous improvement proviso in most quality standards is actually implemented and working.

Compliance is a lagging indicator and reactive - the best outcome is to fix what was wrong. CI is proactive as "improvement" indicates does not just "right wrongs" but sets new standards for excellence. Compliance is generally staff work and improvement requires proactive management support and enthusiasm which is often absent. Some companies do change their approach and become proactive within the culture of compliance in which they exist. A very few companies have continuous improvement "in their DNA".

The authors contend that the challenge for the next phase of the quality movement, both for practitioners and academic researchers, is to determine how to operationalize the promise of continuous improvement, not just to pass an external audit, but to enhance competitiveness and achieve true excellence.

Much of the promise of the quality movement has not yet been realized. A much larger study incorporating working quality professionals in the global private and public sectors, academic researchers, and registration organizations, especially ISO, could boost the contribution of quality thinking to more widespread economic prosperity and concomitant world peace.

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Video Tutorials: An Appropriate Way of Teaching Quality Management Tools Applied with Software

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ABSTRACT

Purpose: The aim of this research is to verify the applicability of video tutorials for the improvement of software skills.

Methodology/Approach: Video tutorial prototypes were created according to design criteria found in literature and tested as teaching material of self-organized/self-regulated learning. 65 students were parted in two groups and asked to work on an assignment concerning the use of quality tools in Microsoft Excel. One group used video tutorials and the other group was guided by a teacher. Before and after the assignment the students were asked to fill out a survey evaluating their software skills as well as the aid used during the test.

Findings: The results of the survey do not show a significant difference between the evaluation of video tutorials and guidance of the teacher. Also the performance of both groups concerning the assignment was comparable. From these findings it can be concluded that video tutorials and classroom teaching are equal ways of teaching in the investigated field.

Research Limitation/implication: The suitability of video tutorials for the application of quality-tools with the use of appropriate software has been confirmed. The results do not show conclusions about the extent to which video tutorials can be suitable for the mediation of complex issues. Follow-up studies are required for this purpose.

Originality/Value of paper: The study demonstrates that video tutorials, as a form of self-organized/self-regulated learning, are suitable to improve skills in applying quality tools by using software.

Category: Research paper

Keywords: video tutorial; education; knowledge transfer; quality tools; software

1 INTRODUCTION

In the past years video tutorials became a wide spread method of transmitting instructions for the use of software (van der Meij and van der Meij, 2014). There are three main factors for the recent development of using video tutorials for software learning. On the one hand there is a rising request for new or updated software programs that users demand instructions for. On the other hand there is a fast improvement of easy-to-use software programs such as Camtasia, Sceencast-O-Matic or QuickTime which are brought to the market from the supply side. Additionally, a quick and easy way of uploading video tutorials on internet platforms such as YouTube has facilitated the distribution of videos and allows reaching a wide audience (van der Meij and van der Meij, 2013).

The academic teaching has also been affected from these changes, due to an increased interest of using new media and technologies as well as the internet and internet-based learning systems. The advantages of online learning have become widely approved (Saadé, Bahli, 2005). The popularity of computer-based learning and video tutorials in particular has likewise influenced the way of transferring knowledge in higher education institutions such as universities. In contrast to a tutoring class that has to be scheduled and requires a time commitment of several people at the same time, video tutorials can fix deficits among students through self-organized/self-regulated learning as a study from 2012 has shown for a university chemistry class. This study found out that video tutorials compared to live tutors were also a convenient tool to improve students' performance in class (He, Swenson and Lents, 2012).

1.1 Analysis of the problem situation – recognition of competence gaps

Computer skills are in today's professional life often essential. The computer is one of the most used means of employed persons. A study by the Statistical Office of the European Union revealed that in Europe in 2014, 52% of employees regularly used a computer. In Germany, it was 61% in 2013. The use of computers increases the productivity and efficiency of businesses and industries of all sizes and thus makes them more competitive (Eurostat, 2015a). In 2014, the Statistical Office of the European Union published a statistic about the computer skills of the European population. It was found that 45% of the respondents have low or no computer skills. Only 44% of the 16-74-year-olds have knowledge of the application of simple formulas in spreadsheets. Among the 16-24-year-olds there are 65% possessing this kind of knowledge. In Germany, 48% of the 16-74-year-olds have knowledge of the application of simple formulas in spreadsheets and 63% of the 16-24-year-olds (Eurostat, 2015b). Skills on how to use statistical and spreadsheet software is required in many areas, including quality management. Nowadays, it is a rare case that companies write their quality control charts by hand or use a calculator to determine the correlation coefficients. For this reason, it seems useful to promote

the acquisition of the required competencies in this area at an early stage. It is necessary to regard the heterogeneity of the learner's prior knowledge in order to perform a successful knowledge transfer. At the same time the method should be as resources efficient as possible. A study examining the impact of video tutorials and instructor feedback on skill acquisition in the medical field suggested that using video tutorials can minimise the need for instructor involvement and therefore reduce costs (Stefanidis, et al., 2007).

1.2 Identification of a possible approach – self-organized or self-regulated learning as a learning concept

Objectives of self-organized/self-regulated learning include the increase of self-responsibility for ones own learning (Witten, Penon and Dietz, 2006). The concept of self-organization or self-regulation of learning processes can be found in all areas of education. It starts with school education and is also used in university education, vocational training and in adult education (Baumeister, 2004). Self-organized/self-regulated learning emerges from the 1970s movement of changing from teacher-centered approaches towards student-centered approaches (Schunk, 2004). The self-organized/self-regulated learning means a methodical activation of cognitive, motivational and behavioral processes for the achievement of educational targets (Zimmermann, 2008). Self-organized/self-regulated learning creates a number of positive effects. It leads to faster learning and a long-lasting memory due to the activation processes. The motivation of the learner will be extended through the use of practical actions. Furthermore, the flexibility of the learning content and the self-regulated time management of the learning activities are advantages of self-organized/self-regulated learning (Preißer, 2006). The application of methods of self-organized/self-regulated learning can cause a positive effect on students' academic performance. It has been reported that self-organized/self-regulated learners are more effective, efficient and productive compared to other students (Wolters, 2010). Since there is an increasing demand for a lifelong learning, the ability of technology-based self-organized/self-regulated learning will become more and more important in addition to traditionally organized learning offerings (Kalz, Koper and Hornung-Prähauser, 2009). E-learning, which means electronically supported learning, is such a technology-based form of learning which became increasingly popular due to the fast development of computer technology. Another reason for its popularity is the access to an extensive amount of information (Low and Putaj, 2012). The most important characteristic of e-learning is the ability of including various kinds of media, like graphics, audios and videos in order to generate instructional material (Sun and Cheng, 2007). It can be used both online and offline. For this form of learning computers and the internet are used, either to impart knowledge, or to support learning processes (Ehlers, 2011). The aim of e-learning is to design educational offers in an adequate and innovative way. Moreover, e-learning should help increase the chance of a fair educational access (Revermann, 2009).

The smallest meaningful learning unit of e-learning is a learning object. A video tutorial can be regarded as a learning object (Revermann, 2009). Learning objects represent a new way of managing learning content. They can be used separately as a single learning unit or grouped to create a collection of content, for example in order to structure a whole course. They can be applied in various contexts and they are reusable (Chiappe, Segovia and Rincon, 2007). In contrast to a common believe that watching videos could be a passive action, studies report that watching learning videos can cause high cognitive action that is needed for active learning (Mayer, 2001). There are a couple of reasons why videos can trigger active learning. Videos respond to multiple intelligences as they use different styles of delivering content and they have an emotional affect on the viewer (Gardner, 2006). Information is transmitted both through the aural and visual channel which creates a richness of input that can lead to remembering the information better (Mayer, 2001). By stimulating two senses at once video tutorials become suitable for different types of learners (Fortino and Zhao, 2012). An advantage of video tutorials is the adaptability to the individual learning pace. Video tutorials can be played any number of times; they can be stopped, repeated and skipped over sequences (Revermann, 2009). However, a disadvantage of video tutorials is the relatively time-consuming creating process (Niegemann, 2004). Video tutorials can, for example be offered by educational institutions as an additional learning material for a seminar or an online course. For some university courses, like the teaching of laboratory skills in biology, a blended approach of combining face-to-face-teaching with video tutorials has been suggested as the most successful way of teaching practical skills (Truebano and Munn, 2015). The use of video tutorials for different areas of learning at universities and schools has been analyzed in a number of studies. In the following Table 1, a review of literature regarding the effect of video tutorials on learning outcomes is presented. Further studies dealing with this topic can be found from authors such as Morgan, et al. (2002); Balslev, et al. (2005); Boster, et al. (2006); Coffee and Hillier (2008); Jones, et al. (2010) and van der Meij and van der Meij (2014). All studies confirm that the learning performances supported by the use of video tutorials are similar to those supported by a teacher or other teaching materials. In some cases, the groups that used video tutorials even performed better. The suitability of video tutorials for teaching software skills in quality management has not been examined in the collected studies.

Table 1 – Literature review

author, year, title	data base	method and research question	results
Siegel, P.H./ Omer, K./ Agrawal, S.P., 1997, Video simulation of an audit: an experiment in experiential learning theory. Accounting Education 6	The participants of this study were students of the introductory course of accountancy. Two groups were compared, the introductory course of the winter semester with the introductory course of the summer semester. I: (WS) n = 40 II: (SS) n = 60	The aim of the study was to examine the effects of learning videos for the students of the accountancy course. The first group received instructions by a video tutorial in addition to the regular lecture, while the second group only attended the lecture.	The study showed that the students of the first group were significantly better in the course sections than the second group, who had no learning video. The author indicates that all students who participated in the experiment had the same starting conditions.
Stefanidis, D./ Korndorffer, J. R./ Heiniford, B. T./ Scott, D. J, 2007, Limited feedback and video tutorials optimise learning and resource utilisation during laparoscopic simulator training	The Participants of this study were 34 medical students, divided into three groups: I: 1 x video tutorial + intense feedback n = 9 II: 1 x video tutorial + limited feedback n = 13 III: several times video tutorial + limited feedback n = 12	The aim of the study was to determine the influence of instructor feedback and video tutorials on the performance during laparoscopic simulator training.	All groups achieved the proficiency level for two attempts in a row. The group watching the video several times and having limited feedback (group III) needed the shortest time and number of repetitions to reach proficiency with statistically significant differences compared to group I. Using video tutorials in combination with limited instructor feedback was found to be the best method.
DeVaney, T.A., 2009, Impact of Video Tutorials in an Online Educational Statistics Course	The participants of this study were 78 students of an online statistics course.	The aim of the study was to evaluate the attitude of students towards video tutorials and to examine differences in performance between lessons in which video tutorials were used and lessons where no video tutorials were used. For this purpose the course participants filled an on-line questionnaire with nine items using a 5-point Likert scale.	The study found that video tutorials were an effective component of the course. 75% said the videos were enjoyable and interesting. 85% said the videos met their needs. 90% believed that the content was easier to understand while watching a video than reading it in a book. There was no significant difference in the performance of students in the tutorial and non-tutorial sections of the course.

author, year, title	data base	method and research question	results
He, Y./ Swenson, S./ Lents, N., 2012, Online video tutorials increase learning of difficult concepts in an undergraduate analytical chemistry course	The participants of this study were 27 students enrolled in an undergraduate analytical chemistry course.	The study aims to evaluate the inclusion of video tutorials, as an additional learning aid, in an undergraduate analytical chemistry course. The effectiveness of the video tutorials was tested by looking at the pre- and post-video-tutoring exam performance, a comparison to data from previous classes and an oral and written feedback of the students.	The study shows that video tutorials are a valuable, flexible and cost-effective tool to help students with their chemistry problems.
Truebano, M./ Munn, C., 2015, An evaluation of the use of video tutorials as supporting tools for teaching laboratory skills in biology	The participants of this study were undergraduate students with minimal experience in a laboratory environment. They were divided in 3 groups: I: Face-to-face training only n = 5, II: face-to-face training + video n = 4, III: video only n = 5.	The study aims to assess the use of video tutorials in a laboratory-based molecular biology class and to find out how video tutorials affect students confidence when first facing the laboratory procedure alone.	This study shows that a blended approach, using face-to-face training plus video tutorials, led to the best performance among the tested students when facing the procedure alone. Using the video increased students' confidence of carrying out the procedure alone.

2 METHODOLOGY

2.1 Developing a solution - creating video tutorial prototypes

In order to carry out a study that examines the effectiveness of video tutorials for the imparting of knowledge for the application of quality management tools with statistical and spreadsheet software, video tutorial prototypes were developed. Before creating the prototypes, general requirements were determined for the design of video tutorials.

Becher identified two design criteria for video tutorials through an analysis of video tutorials from the online platform YouTube. On the one hand video tutorials should be designed to the learners taste, concerning the content and language, the speech speed, the pronunciation, the introduced examples and visualizations as well as the authenticity of the video. Secondly, the video tutorial should have a clear structure, thus learning content can be easily captured. Outline and objectives, as well as repeating elements and processes contribute to a familiarity with the video tutorial (Becher, 2012).

Van der Meij and Van der Meij developed special guidelines for the design of video tutorials that give instructions for software. Videos for software training should be created in a way that improves the learner's procedural knowledge. The videos should therefore be a recorded demonstration showing how to solve a certain software task, in combination with spoken instructions directing the learner's attention to the important software elements such as menus and icons. Eight guidelines should be regarded during the creation of such a video: 1. Provide easy access, 2. Use animation with narration, 3. Enable functional interactivity, 4. Preview the task, 5. Provide procedural rather than conceptual information, 6. Make tasks clear and simple, 7. Keep videos short and 8. Strengthen demonstration with practice (van der Meij and van der Meij, 2013). The Table 2 contains a summary catalogue of didactic design options for video tutorials.

Table 2 – Literature Didactic design possibilities of video tutorials (Wieser, 2010)

1. Create attention	**2. Clarify relevance**	**3. Pursue volitional strategies**	**4. Promote autonomous action**
method: - animations - graphics - impressive images/ facts - provocative statements - questions	method: - formulation of objectives - development of correlated qualification - illustration of results sequence relationships	method: - alternative solutions - surprise effects - information concretization - further reading	method: - summaries - flashbacks - rehearsal questions
intention: - to arouse interest - picturing of learning content	intention: - emphasizing the practical benefits - promote success confidence	intention: - individualization - increase concentration - promote joy of learning	Intention: - create reference to reality - strengthen capabilities - test your knowledge

Three video tutorial prototypes were developed in accordance with the design requirements. The video shows how to create a histogram, a Pareto analysis and a control chart with Microsoft Excel. The three different quality tools were used due to their proven different complexity (Worlitz and Woll, 2015). Microsoft

Excel was chosen because of the expected heterogeneity of knowledge of this software (Eurostat, 2015 b). The video tutorials were recorded with the software Camtasia Studio 8 by TechSmith and have a duration time of 8, 10 and 13 minutes. For all videos the computer screen was recorded during the application of quality tools with Microsoft Excel and afterwards, comments were added using a headset. Since the prototypes were tested in groups consisting of German students, the voice-over is in German. The application of quality tools was illustrated by a sample tasks. The structural setup of all three video tutorials followed the same pattern. First, an outline showing the processing steps of each task is presented. Then the definition and the finished chart are displayed, so that the learners already get an idea of the final result of the task at the beginning.

For each video it is ensured that the faded in elements are always designed and arranged in the same manner, in order to create regularity in the structure of the videos and to produce a recognising value. The chair logo is displayed in the upper right corner of the video tutorials. This will also increase the brand recognition and authenticity of the video. Next, the sample task is performed and narrated step by step. For each step the respective structure point is faded in for orientation. Also, the logo is retained in each newly inserted Excel spreadsheet. To understand important steps better, animated arrows and framings are used in the videos. The visual highlight is supposed to increase the attention of video users.

The voice-over descriptions are spoken with a suitable pace of speech and a distinct pronunciation. Since the video tutorials are supposed to be used to support University lessons, the language level of the comments is target group-oriented. The video tutorials are not only limited to description of necessary procedures in Microsoft Excel. Scientific facts concerning QM tools and a subsequent interpretation of the results are part of the videos. Most of the captured design requirements have been used in the preparation of the prototypes to ensure the suitability of the videos.The six work packages of structuring, selecting a sample task, preparing the workbook, image recording, sound recording and postproduction took at least half an hour each per video tutorial. The creation of a prototype took therefore three to four hours.

2.2 Evaluation of the solution - evaluation of experiments with experimental groups

Objectives and theoretical construction of the survey

For the intended purpose of examining the impact and the suitability of video tutorials, a survey of students was carried out. The survey is intended to clarify whether the use by video tutorials is perceived as comparably helpful by the test persons (H 0a) and if it delivers comparable results (H 0b) to the personal supervision by a teacher. Furthermore it should be investigated whether the processing time differs between the use of video tutorials and personal

supervision (H 0c), and whether or not video tutorials are suitable for students with heterogeneous prior knowledge (H 0d). For this purpose four zero hypotheses are established from the following alternative hypotheses.

H 1a The type of aid used (video tutorial or teacher) has an influence on the assessment of the aid's suitability to solve the given task.

H 1b The type of aid used (video tutorial or teacher) has an influence on the students' results of the given task.

H 1c The type of aid used (video tutorial or teacher) has an impact on the time taken by the students for the given task.

H 1d The previous knowledge of the students in Microsoft Excel has an impact on whether or not they want video tutorials for this topic.

In addition to the four hypotheses, it will be examined, which patterns of video tutorials-use already exist among students and which requirements they have for video tutorials.

Database of the survey and survey strategy

Students of the course "Fundamentals of quality teaching" at the Brandenburg Technical University of Cottbus-Senftenberg were the participants of the survey. An optional supplementary seminar was offered to students of the course to practice the application of quality tools with Microsoft Excel. The seminar was attended by 65 students, aged between 19 and 28 years. 62% of the participants study Business Administration, 32% Industrial Engineering and 7% in other technical disciplines.

The study participants were randomly divided into two groups and carried out the seminar in two different rooms (group 1 n = 31 and group 2 n = 34). Each of the two groups was divided again in three sub-groups. One of the three quality tools histogram, Pareto analysis or quality control chart was assigned to each sup-group. Both groups worked on the same sample tasks. The first group got assistance by a teacher to handle the tasks. The second group used the video tutorial prototypes. The same instructor was involved in the development of the video tutorial prototypes in order to exclude the possibility that personal characteristics of the teacher or video producer influence the test procedure. The students of both groups were asked to fill out a questionnaire before and after the seminar. The survey was carried out anonymously. By using identification numbers it was possible to match the questionnaires. It took about ten minutes to complete the survey. The two questionnaires were designed as follows.

The first questionnaire, which was completed before the seminar, contained a small introductory text followed by a collection of personal data of the students, such as age, degree, gender, semester and personal Microsoft Excel skills. It was further asked whether or not the person has already visited Microsoft Excel training courses, how often the person uses Excel, and what they expect from the seminar. The introductory text was a brief clarification of the survey project,

without giving too much information. The data about knowledge and use of Microsoft Excel were collected in order to determine if the students have already had experience with this program and if there is a connection between Microsoft Excel-knowledge and the desire for video tutorials.

After the seminar, a second questionnaire was filled out by the students. In this part of the survey, students were supposed to evaluate how well they were able to manage the task using their assigned aid. This was followed by questions concerning video tutorials. The students were asked about their usage patterns, their wishes and needs in terms of video tutorials. The design requirements of video tutorials were determined based on previously acquired general design criteria. The data of the second questionnaire were evaluated to determine, if students consider video tutorials as an appropriate teaching method, if they want video tutorials in the university as teaching means and what demands they impose on a video tutorial. As a further data source the results of the tasks completed by the students in the seminar were included to determine whether the two groups showed differences in their performances.

Analysis and results of the survey

The software SPSS IBM and Microsoft Excel were used for the data analysis of this study. All four hypotheses were tested by a single factor variance analysis of a significance level of 0.05. The data were tested for the suitability of an application of variance analysis. Using the Levene test and the Kolomogorov-Smirnov test, the data were tested for variance homogeneity and normal distribution. Since the variance analysis is resistant to violations of the mentioned application requirements (Toutenburg and Knöfel, 2007), it is used here as the method of data analysis despite small premise deviations of some variables.

An influence of the used sample tasks and consequently the degree of complexity of the quality management tools on the results has not been found. For this reason, the following analysis is not specified by the type of sample task. In the first step it was examined whether the type of method used (video tutorial or teacher) has an impact on the dependent variable "assessment of each method". The variance analysis proved that the evaluation of the video-tutorial and teacher did not differ significantly in the two examined groups. The alternative hypothesis H 1a has not been confirmed (see Table 3).

Table 3 – ANOVA Test on H0a

One way factorial ANOVA

How helpful was the assistance to the task?

	Sum of square	df	Mean square	F	Significance
Between the groups	.333	1	.333	.098	.756
Within the groups	214.652	63	3.407		
Total	214.985	64			

In the second step, it was examined if the type of method used (video tutorial or teacher) has an effect on the dependent variable "task performance". The variance analysis showed that the results of the sample task of the two groups do not differ significantly. The alternative hypothesis H 1b was not confirmed (see Table 4).

Table 4 – ANOVA Test on H0b

One way factorial ANOVA

How well was the task accomplished?

	Sum of square	df	Mean square	F	Significance
Between the groups	.463	1	.463	.271	.605
Within the groups	88.741	52	1.707		
Total	89.204	53			

In the third step, it was examined whether the type of method used (video tutorial or teacher) has an effect on the dependent variable "processing time". The variance analysis showed that the processing time of the accomplishment of the sample task between the two groups does not differ significantly. The alternative hypothesis H 1c has not been confirmed (see Table 5).

Table 5 – ANOVA Test on H0c

One way factorial ANOVA

Processing time for the task in minutes

	Sum of square	df	Mean square	F	Significance
Between the groups	270.909	1	270.909	2.794	.107
Within the groups	2521.198	26	96.969		
Total	2792.107	27			

The processing time was in average about 30 minutes. The maximum was 50 minutes and the minimum was 9 min. The time was only started to be measured after explaining the task. In the fourth step, it was tested if the level of knowledge of the subjects has an influence on the desire for video tutorials. The variance analysis showed that there was no significant difference in the desire for video tutorials between the groups. The hypothesis H 1d has not been confirmed (see Table 6).

Table 6 – ANOVA Test on H0d

One way factorial ANOVA

Would you want VT for Excel knowledge improvement?

	Sum of square	df	Mean square	F	Significance
Between the groups	.630	5	.126	.984	.436
Within the groups	7.042	55	.128		
Total	7.672	60			

Out of the 65 students surveyed, 50 students expressed the desire for video tutorials for the application of quality management tools using Microsoft Excel.

In average, the students evaluated their Microsoft Excel skills with a value of 3.2 on a Likert scale of 1-7 (very low – very good knowledge). Most students rated their Microsoft Excel skills to be rather low. 11% of the test persons had visited a Microsoft Excel course. When asked how many students use Microsoft Excel, 56% said that they use Microsoft Excel on a monthly basis.

The survey captured the importance of certain requirements to design criteria for video tutorials. The students were asked to evaluate the personal importance of characteristics of a video tutorial on a Likert scale of 1-7 (not important – very important). The analysis shows that the students find that the technical accuracy of the video tutorials is the most important and the speaker's voice is the least relevant characteristic. However, none of the criteria have been considered as absolutely insignificant. All design criteria were rated with an average of at least 4.8. When asked if they believe that video tutorials are an appropriate aid to complete the given tasks, 92% of the participants answered with yes.

3 CONCLUSION

The survey has shown that students evaluate their Microsoft Excel skills in average as rather low. Very few students have already attended Microsoft Excel trainings and most students do not yet use Microsoft Excel daily or weekly. From this it can be concluded that most students do not work often with Microsoft Excel, and therefore have no distinct knowledge. The survey shows that almost

all students expressed the desire for specific video tutorials; which means that students are interested in compensating the deficits in this area. Even students, who perceived their Microsoft Excel skills as medium or high, showed interest in video tutorials of this kind in order to improve their skills. The demand for video tutorials for the application of quality management tools with Microsoft Excel is consequently given.

Both test groups estimated that their assigned aids to complete the tasks in the seminar were equivalent. From the perspective of students, there is no significant difference whether or not the knowledge to be learned is transmitted by a teacher or by a video tutorial. The review of the performances in the seminar and the processing time confirmed the equivalence of the performance of both groups. Furthermore, the complexity of the quality management tool did not influence the results. From this can be concluded that video tutorials are as suitable for teaching Microsoft Excel knowledge for the application of quality management tools as the mediation by the teaching staff. The use of video tutorials as an additional learning material can therefore be approved. At this point it should be noted that only the suitability of video tutorials for the application of quality-tools with the use of appropriate software has been confirmed. The results do not show conclusions about the extent to which video tutorials can be suitable for the mediation of complex issues. Follow-up studies are required for this purpose.

The evaluation of the design criteria of video tutorials confirms the relevance of compliance with the general design criteria for the creation of prototypes. Based on the results, priorities for the creation of further video tutorials can be regarded. The initial investment in the video tutorial production is approximately three to four working hours for trained developers. Further, suitable software and hardware for video and audio recordings is required. A video tutorial can be used for a limited time due to software updates. In Microsoft Excel it is usually three years. For this example, it means that a video tutorial can be used for six semesters due to its reusability. Each tutorial can replace a one-hour seminar. The four hours of production time face six hours of saved personal supervision in seminars. In addition, students can use the video tutorials again at a later time to refresh their knowledge. Students with high prior knowledge can skip certain content and thereby acquire new knowledge more efficiently. To determine the frequency of the usage of video tutorials and the resulting need for videos more precisely, a follow-up study should be carried out, examining the real usage patterns of video tutorials, evaluated over the course of an entire semester. The creation process can be integrated into the course. The students create a video tutorial in groups while being supervised by a teacher. The resulting pool of video tutorials can be used by all students. The students acquire knowledge through experiential learning and learning by teaching.To determine whether this approach has an impact on the usage patterns and the learning, further investigations should be carried out. Through the integration of video tutorials in the knowledge management of companies, competence gaps of employees could be closed in the same way. Follow-up studies are also recommended in this area.

Finally, it can be said that the use of video tutorials for the application of quality management tools using statistical and spreadsheet software allows a resource-efficient knowledge transfer while maintaining the quality of the results. Consequently, video tutorials are an effective tool to supplement teaching in this area of application.

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Interactions between Ideas and Behaviour in Organisations

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ABSTRACT

Purpose: To develop and test a framework which can be used to facilitate the understanding of how ideas interact with behaviour in organisations, in ways that have practical relevance in organisational development and improvement.

Design/methodology/approach: The framework proposed in this paper is the product of an abductive research process. This process involved testing and reflecting in action, and on action when writing. The emerging framework was also challenged by theoretical input from continual literature studies and has (at different stages of its development) been part of the theoretical framework for a PhD dissertation, research articles and master's theses.

Findings: The framework graphically highlights the relationship between explicit (i.e., spoken or documented) and tacit ideas, and that the latter is what largely controls action. It also implies that for new explicit ideas or theories to become effective, they have to become part of the tacit guiding ideas. This is often difficult to achieve. The framework gives a perspective on why this is the case and how it can be counteracted, including by: addressing the coherence between its parts; supporting sense-making; and seeing development as iterative and contextual.

Practical implications: The framework has been tested with practitioners and has rapidly assisted professionals in making explicit, and developing, tacit knowledge. It has also been successfully used in analyses in several papers, including studies of sustainability and process management.

Originality/value: The implications of the framework are in line with existing research, yet we believe that the graphical model adds both scientific and practical dimensions. This is partly due to the framework making it easier to differentiate between complex concepts that are often confused.

Category: Conceptual paper

Keywords: Conceptual framework; tacit guiding; change management; sustainability; naturalizing

1 INTRODUCTION

Organisations continuously renew themselves by absorbing and (re)creating new ideas (Alänge and Steiber, 2011). This can happen independently of management, but is also often the result of a strategic decision to 'implement' or 'adopt' a certain concept and the ideas related to it. The application of such concepts in change projects often does not give the intended results (Keating et al., 1999; Beer, 2001), as associated ideas are not naturalized as part of a process leading to genuine change and improvement (Book, 2006). Instead, the changes achieved from such projects are often both inefficient and transient.

There are various reasons indicated in the literature. One reason is the inertia of knowledge and competence (Alänge, Jacobsson and Jarnehammar, 1998), though it also depends on the way improvement projects are carried through (Nadler and Tushman, 1997). Another reason, raised by Book (2006), is the risk of focusing on work 'in theory' that is not sufficiently connected to improvement 'in action'. An example of this is focusing too much on process maps and procedures as opposed to cultivating change in behaviour. Lack of clarity in language (e.g., calling both process maps and actual ways of working 'processes') and associated lack of clarity in focus risk reinforcing this tendency (Book, 2006).

This paper presents a conceptual framework which can be used to facilitate the understanding of how explicit and tacit ideas interact with behaviour in organisations in ways that have practical relevance in organisational development and improvement. The framework can act as a 'sensitising device' (Weick, 1976, p.2) to provide a better understanding and new perspectives on organisational change, as well as to clarify related terminology. It can also function as a communication and planning tool for ongoing change and learning processes.

The framework is the product of an iterative and abductive process and builds on a combination of experience from the field and theories/ideas. Four central theoretical contributions come from Argyris and Schön (1996), Weick (1995), Kahneman (2011) and Nonaka (1994). In this article, the framework will be described, and its usefulness analysed and illustrated through practical cases.

2 METHOD

The research follows an abductive logic (Dubois and Gadde, 2002) where empirical data from various company cases meet theories and an emerging theoretical framework in an iterative learning process. It can be described as a kind of 'first-person action research' process in line with Lifvergren (2013), based on the authors' experiences. It started in a learning alliance (Frischer, 2006), in which Marmgren and Book, based on their respective

preunderstandings (Gummesson, 2000), were searching for a shared understanding of naturalization processes where improvement takes place within and among organisations. One starting point was the realisation that there was a need to understand why there frequently seemed to be a large discrepancy in organisations between what was written, what was said and what was actually done. An effect of this search was the invitation of Alänge into the learning alliance, and the subsequent initiation of more systematic research as part of a doctoral process for Marmgren. Then, a more theory-driven development started involving sense-making (Weick, 1976) when writing articles as well as sense-making in action, when driving organisational change. The observations from consultancy practice and earlier research (e.g., Book, Alänge and Solly, 2004; Book, 2006) made us select a research approach where we initially re-analysed earlier empirical data and simultaneously developed our theoretical understanding by testing and refining our initial theoretical model.

The early version of the model was developed based on our pre-understanding (Gummesson, 2000) from practice, earlier research and literature studies in the area of learning and behavioural change in organisations. Specifically, observations concerning ambiguous uses of concepts both by practitioners and researchers stimulated the development of a first version of a framework aimed at making a distinction between the complex reality and what could be distilled into a document. In order to test this framework, we initially used empirical data from Book's PhD process (2006) and made a reanalysis of the TQM-based change process at Fagersta Stainless AB from 1984 to 1999 (Marmgren, Alänge and Book, 2012). The authors assumed complementary roles on a scale from insider to outsider, which can be beneficial for research (Alänge and Mellby, 2006; Brannick and Coghlan, 2007), as it provides additional opportunities for reflection and triangulation. In parallel, according to the chosen abductive approach, the empirical findings were discussed relating to literature. The result of the first article (Marmgren, Alänge and Book, 2012) was the development and initial verification of the framework.

According to the abductive logic chosen, in our next phase of systematic combining (Dubois and Gadde, 2002), a literature review was conducted. The first outline of the model had been built based on our preunderstanding; this time, the intention was to make a thorough review of earlier research on the subject area, and specifically the understanding of subconscious or tacit knowledge dimensions. This included going back to classical writers on management and on understanding the role of intuition, values, routines and more hidden assumptions and tacit knowledge components in decision-making and change processes (Schumpeter, 1934; Barnard, 1938; Polanyi, 1966; Argyris and Schön, 1978, 1996; Nonaka, 1994; Kahneman, 2011).

This abductive way of iterating between empirical and theoretical phases has been described as a heuristic spiral (Gummesson, 2000) where the conceptual framework itself is being refined in parallel to the development of empirical understanding.

Next, followed a period when the framework was tested in a number of practical settings in order to verify its validity in consultancy practice by co-authors Book and Marmgren (Gummesson, 2000; De Guerre, 2002), as well as in further research (Clancy, 2014; Book, Marmgren and Gustafsson, 2014; Alänge, Clancy and Marmgren, 2016). It was found that the framework made sense for practitioners who commented that the framework provided new insights regarding an area that they had earlier perceived familiarity with. Hence, these practical tests contributed to improving our understanding of the usefulness of the framework and its ecological validity.

The authors have approached the task from a constructionist perspective aiming at developing a framework that can provide value both for practitioners and academics. The intention has not been to develop the ultimate and general framework; rather, the approach has been to develop a framework that can be used for various analyses and that can also be modified to meet specific analytical needs. Early on, the strength of visual communication was acknowledged, as well as that the framework in its graphical simplicity supports 'visual ambiguity' (Worren, Moore and Elliott, 2002), stimulating different interpretations and thereby also the development of the framework. Different versions of the framework model have been used for direct communication and verification both of analysis content and of the model itself.

Based on a constructivist stance and analytical generalisation of our extensive experience of using it, we believe that the framework can be useful in analysing any type of organisation.

3 THEORIES ON THE INTERACTION OF IDEAS AND BEHAVIOUR

The starting point in our search for a useful framework was our practical experience working in and with organisations, and our observations in earlier research studies. We sensed that leaders were often having problems in trying to use management ideas[1] to influence the behaviour of individuals and groups in organisations. What leaders say and what is documented do influence to some extent, but the processes of naturalisation are often problematic (Book, 2006). Hence, ideas which could be productive often do not become a natural part of thinking and acting in a productive way.

[1] Ideas can be understood as related sets or structures in constant dynamic/interaction, which are also affected by external influences. This is in line with Barley (1986) who write that 'Structure can be viewed simultaneously as a flow of ongoing action and as a set of institutionalized traditions or forms that reflect and constrain that action'.

3.1 Underlying mechanisms

The underlying mechanisms influencing the process towards a successful use of the management ideas are often complex and poorly understood. Furthermore, these mechanisms are often difficult to clarify and problematic to address in order to gain positive results from the use of the ideas. Another challenge can be to identify and expose ideas that have a strategically poor fit with the organisation at hand. One idea may be good in one organisation yet not in another (Alänge, Clancy and Marmgren, 2016). So what we were striving for was to better understand and explain an important issue in many organisations. This issue concerns the interaction between ideas and behaviour, among individuals and groups in organisations, on the way towards improvement.

This issue is not new and over the years there have been important contributions that have been forgotten or maybe not fully understood. Thus, as a first step, we went back to previous literature, starting with two classical writers on management and change. What is guiding individuals are not only explicit instructions and analytical thinking, but also what has been expressed as intuition, subconsciousness and culture. That our behaviour is not mainly guided by conscious decisions or rules, but by something more tacit was stated early on by Schumpeter (1934, pp. 63-64), who writes:

> *Every man would have to be a giant of wisdom and will, if he had in every case to create anew all the rules by which he guides his everyday conduct… This is so because all knowledge and habit once acquired becomes as firmly rooted in ourselves as a railway embankment in the earth. It does not require to be continually renewed and consciously reproduced, but sinks into the strata of subconsciousness. It is normally transmitted almost without friction by inheritance, teaching, upbringing, pressure of the environment. Everything we think, feel or do often enough becomes automatic and our conscious life is unburdened of it.*

Barnard (1938, pp. 302-303) differentiates between 'logical' processes *'conscious thinking which could be expressed in words, or other symbols, that is, reasoning'*, and 'non-logical' processes that *'…are not capable of being expressed in words or as reasoning, which are only made known by a judgement, decision or action. This may be because the processes are unconscious, or because they are so complex and rapid, often approaching the instantaneous, that they could not be analysed by the person within whose brain they take place'*. Barnard argued that the latter's significance was, *'obscured by the general belief that reasoning indicates a higher order of intellect than do the non-logical processes underlying quick judgement'*. According to Barnard (1938, p. 305) these processes, *'run all the way from the unreasoning determination not to put the hand in the fire twice, to the handling of a mass of experience or a complex of abstractions in a flash'*, and he stresses that *'we could not do any work without this type of mental process'* that is so unexplainable that it goes

under many names, such as intuition, good judgement, inspiration, stroke of genius, common sense, and more.

Several years later the Nobel Prize laureate Kahneman (2011) presented theories that show many similarities to the two earlier researchers' empirically based observations. The subconscious and effortless thinking that governs most decisions made by an individual, Kahneman (2011) refers to as System 1: *This fast thinking includes two variants of intuitive thought, the expert and the heuristic, as well as the entirely automatic mental activities of perception and memory*' (Kahneman, 2011, p. 13). The 'expert intuition' is what Herbert Simon identified as a form of recognition, when an expert is able to access information stored in the memory to analyse a new situation (Simon, 1992). The essence of 'intuitive heuristics', on the other hand can, according to Kahneman (2011, p. 12), be explained as '*when faced with a difficult question, we often answer an easier one instead, usually without noticing the substitution'*. Tversky and Kahneman (1974, p. 1) state that '*In general, these heuristics are quite useful, but sometimes they lead to severe and systematic errors'*.

Kahneman also introduces System 2 which refers to a slower, conscious and more attention-demanding and effortful form of thinking. The System 2 way of thinking has an important role for correcting and setting direction, and also for consciously analysing new situations or problems, though it is not functional as a general way of thinking/deciding, because it is much slower and uses a considerable amount of resources; in other words, it can be 'depleted' when used.

3.2 Learning processes shaping behaviour

The focus of the conceptual framework is on the role of ideas, theories, management models and organisational innovations which can guide learning towards new behaviour in organisations. What is included in an organisational innovation or in a management model differs, but ideas and theories can be seen as the basic building blocks (Weick, 1995). Thus, a starting point could be to discuss the issue from the perspective of ideas/theories and sets of ideas/theories. Sets of ideas/theories can exist on many levels in an organisation. They exist at an explicit level, which corresponds to what Argyris and Schön (1996) call 'espoused theories'. Sets of ideas also exist at a tacit level that normally guides action, which they call 'theories-in-use.' This is in line with the thinking of Schumpeter, Barnard and Kahneman as described above.

According to Argyris and Schön (1996), an individual is normally not aware of which are his theories-in-use, and can typically only become aware to a limited extent, and even then with substantial effort. This can happen through 'double-loop learning,' when efforts are made to deeply reflect upon a situation, including questioning its basic assumptions. If double-loop learning is in use, there is a possibility to go beyond what people express (and mostly also believe in themselves) and go deeper and get in contact with the actual theories-in-use, which then can be questioned and transformed or just be made aware of. Argyris

and Schön (1996, pp. 20-21) contrast this deeper learning with the more common single-loop learning, which can be seen as a regular adjustment, as with that of a thermostat.

There are similarities in between these theories, but there are also differences reflecting their origin and use. Kahneman (2011, pp. 39-43) observed that both cognitive efforts and self-control are forms of mental work that compete for the limited resources available for the System 2 way of thinking. However, sometimes people can spend considerable effort for longer periods of time without having to exercise conscious self-control, a state that Csikszentmihalyi (1990) named 'flow'. So, while Kahneman (2011) primarily refers to the depleting effort of self-control and the substantial resource use that limits the System 2 way of thinking, Argyris and Schön (1996) primarily emphasize that the individual is often not even able to identify his/her own theories-in-use, primarily due to different kinds of defence mechanisms. On an organisational level, the theory-in-use might remain tacit because it is either 'indescribable' or 'undiscussable' (Argyris and Schön, 1996, p. 14). But in line with Schumpeter and Barnard, the similarity between 'theories in use' and 'System 1' is that they are subconscious, fast and follow a rule of least resistance.

3.3 Towards the conceptual framework

The above lines of thought are also in line with Polanyi's and Nonaka's use of tacit and explicit knowledge. Polanyi (1966, p.4) classified human knowledge into two categories, explicit (or codified) and tacit. Explicit refers to knowledge that is transmittable in formal systematic language. Tacit knowledge however, '*…has a personal quality, which makes it hard to formalise and communicate. Tacit knowledge is deeply rooted in action, commitment and involvement in a specific context*' (Nonaka, 1994, referring to Polanyi). Nonaka (1994) develops Polanyi's concepts, claiming that tacit knowledge involves cognitive and technical elements. The cognitive elements centre on 'mental models' (Johnson-Laird, 1983) formed '*by creating and manipulating analogies in their minds*'. These models include '*schemata, paradigms, beliefs and viewpoints*'. The technical elements cover '*concrete know-how, crafts and skills that apply to specific contexts'*. We will use the term 'Tacit guiding' which relates closely to tacit knowledge, theories in use, and the subconscious thinking of System 1.

We will also use the term 'Explicit thoughts and ideas' which relates to explicit knowledge, espoused theories and to the conscious thinking of System 2, and can mainly be observed and shared when spoken and/or documented[2]. Explicit ideas might have more or less support by (the people in) the organisation/unit in focus. According to Barnard (1938, p.163), '*the decision as to whether an order has authority or not lies with the persons to whom it is addressed*', and their

[2] Unspoken explicit ideas might also be important. One example could be when they have an external origin, e.g., from a common culture, but for some reason are not spoken out loud, as in an intercultural setting. Another might be when behavior sparks ideas that are not spoken of or documented.

decisions are based on: if the order can be understood; if it is perceived as not inconsistent with the purpose of the organisation; if it is compatible with their personal interests; and if it is at all possible to comply with. This means that the eventual impact of '*Goals imposed from the top… depend on willing compliance from the bottom*'.

Explicit thoughts and ideas (even accepted ones) might however have a limited impact on behaviour if they are not naturalised (Book, 2006). Weick (1976, p.4) posed a similar argument that: *'Given a potential loose coupling between the intentions and actions of organisational members, it should come as no surprise that administrators are baffled and angered when things never happen the way they were supposed to.'* Similarly, March and Olsen (1976) stated that, *'individuals' goals and intentions may be only loosely coupled to their actions'*, and Argyris and Schön (1996) emphasized that there often is a systemic mismatch between explicit espoused theories and tacit theories-in-use and that '*An organisation's formal documents, not infrequently contain espoused theories of action incongruent with the organisation's actual pattern of activity.'* Meyer and Rowan (1977) also questioned the rational-organisation perspective with formal structures (explicit ideas) purposefully designed to produce results. They argued that formal structure also originates from myths embedded in the institutionalised environment.

From an organisational culture perspective, Schein (1984) shows that what is possible to observe are only the artefacts, for example the physical objects, the way the company is organized, and so forth, as well as what is expressed as espoused values. An organisational culture's underlying basic assumptions (tacit ideas with our terminology) are harder to identify, especially so when it comes to moral values, which are ingrained already at childhood and become very close to the individual's personality (Friberg, 1975, 1976); an organisational culture is built on other cultures (e.g., national cultures). There are obvious similarities between Argyris and Schön's organisational learning theory and Schein's organisational culture theory, in terms of espoused values and espoused theory; moreover, in both theories the complication is that what is espoused does not always reflect what is really influencing behaviour. However, the importance of culture and values to guide behaviour in organisations has been noticed, especially when it comes to organisations trying to unleash creativity among its employees (Tushman and O'Reilly, 1997). Some organisations have even purposefully designed their management systems to rely on culture as the most powerful means for guiding creative individuals (Steiber and Alänge, 2013, 2016). For an organisation to function effectively however, there should be a relative coherence in what you say, write and do ('walk the talk') i.e., in the different parts of the framework to be described below (Alänge 1992; Marmgren, Alänge and Book, 2012)[3].

[3] Brunsson's (1982) use of ideologies captures many items categorized as accepted ideas and tacit guiding when there is coherence, and demonstrates how ideologies then guide action.

Behaviour is also influenced by various other factors, including the restrictions or autonomy created by technology (Karlsson, 1979) and the actions of internal or external stakeholders (e.g., customers). To change behaviour within the same boundary conditions, you have to change either the ideas or the technology (i.e., production line, IT system, etc.) that govern behaviour. If technology is changed in conflict with existing ideas, this change is, however, likely to cause resistance (Argyris and Schön, 1996).

4 CONCEPTUAL FRAMEWORK

From our theory review, it is evident that both tacit and explicit ideas need to be treated if we want to understand the process of influencing behaviour. In our framework, the focus is on the influence of thoughts/ideas/theories on behaviour, and differentiating between explicit and tacit thoughts/ideas/theories (i.e., we do not visualise the influence of e.g., technology). This line of thought produces the couplings visualised in Figure 1:

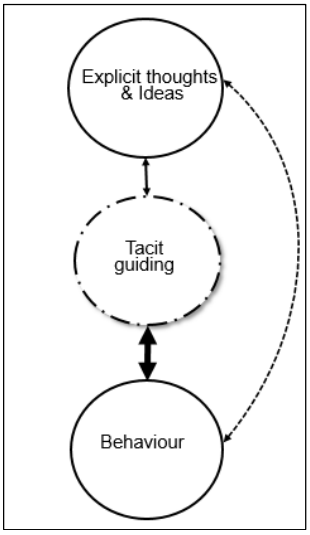

Figure 1 – Interaction between explicit ideas, tacit guiding and behaviour

The dotted line illustrates the normally relatively weak relationship between explicit ideas (normally spoken or documented) and behaviour. The thick solid line indicates the strong connection between the subconscious tacit guiding and behaviour, and that this is normally the key to sustained behavioural change. The broken line surrounding 'Tacit Guiding' indicates that it is not directly observable in the way that behaviour or explicit ideas are.

The interaction shown in the figure relates closely to Nonaka's (1994) concepts of externalisation (tacit to explicit knowledge) and internalisation (explicit to tacit knowledge), with the difference that behaviour is not part of Nonaka's model. For example, Nonaka's concept of socialisation (tacit to tacit knowledge)

in our model would also include the interaction with behaviour. We believe that this adds some clarity and explanatory aspects.

Our experience from organisational change projects has shown that looking at the difference between what is spoken and documented can provide interesting insights into the dynamic of an organisational change project, such as a change in the management system (Marmgren, Alänge and Book, 2012). Figure 2 presents the framework with explicit ideas shown through their manifestations as spoken or documented. The dotted lines illustrate the normally relatively weak relationship between what is spoken or documented and behaviour. The thin solid lines indicate the strength of the relationship between what is spoken and what is documented and also their links to the tacit guiding, which all can vary in strength. The thick solid line still indicates the strong connection between the subconscious tacit guiding and behaviour; that tacit guiding strongly influences behaviour, and vice versa: that behaviour has a strong impact on tacit guiding as when, for example, top managers behave in accordance to what they 'preach' (spoken and documented).

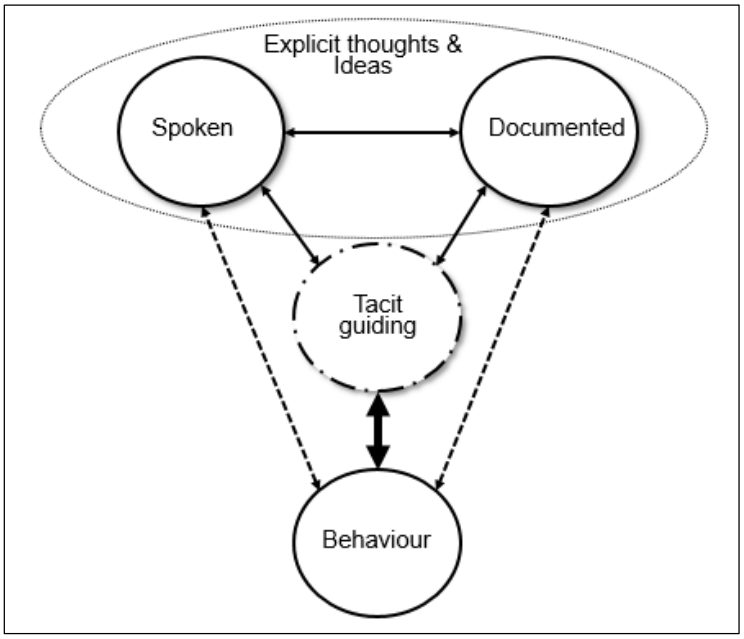

Figure 2 – Relationship between different manifestations of ideas and behaviour (adapted from Marmgren, Alänge and Book 2012)

The different parts of the framework are clarified below:

Spoken (or directly communicated): is normally direct verbal communication, but includes all direct communication and can also be through body language, writing or drawing on a whiteboard with the purpose of immediate communication.

Documented (or indirectly communicated): is indirect communication and normally means texts and figures (e.g., organisational charts, process maps), but can also be recorded speeches, photos of whiteboards, and more.

Spoken and Documented are different manifestations of **explicit ideas**. There are many different (and often contradictory) explicit (sets of) ideas. Some are largely accepted by the organisation/group in focus, while others are not.

Tacit guiding: is the generally subconscious 'patterns' or 'tracks' in our brains that actually guide action in a specific situation whether it is about riding a bike, operating a production line or running a complex project. 'Tacit guiding' cannot be directly observed, but rather inferred by looking at action, or approached by in-depth interviewing.

Behaviour: is patterns of action that in principle can be observed.

In line with what was described in the Method section, several versions of this framework have been tested and used, partially depending on the context and the relative usefulness of different versions.[4]

5 THE FRAMEWORK AS SENSITIZING DEVICE AND ANALYTICAL TOOL

The framework has been used in many consulting projects, in action research projects and in the internal dialogue and development of Effort Consulting AB during half a decade. The purpose has varied and the framework is developing as we scrutinise the processes taking place in relation to the use of it.

One purpose of the conceptual framework is to serve as a 'sensitising device' (Weick, 1976, p.2) that will 'sensitise the observer to notice and question things that had previously been taken for granted'. The sensitising ability (in this case) is closely related to what Worren, Moore and Elliott (2002) call visual pragmatic validity. In our case, this refers to identifying corresponding aspects of the dynamics of an organisation. When the framework has been applied in dialogues (using Figure 2, or testing something closely corresponding) with professionals, the involved persons often experience that they develop a deepened understanding of prior experiences. We believe that this is due to it aiding in connecting subconscious and conscious thoughts in an interactive process, that is, the different parts of the model[5].

Another related purpose of the framework is to serve as a tool for sensemaking (Weick, 1976). By giving new perspectives in organisations, it facilitated the

[4] One version, presented in Book, Marmgren and Gustafsson (2014), includes 'Unspoken' as another part of explicit thoughts and ideas. The purpose of this is to highlight the fact that some ideas might be explicit for some people/groups, though for different reasons not spoken of. 'Unspoken' is then shown with a dotted line to illustrate that it is not directly observable.

[5] Or System 1 and System 2 (Kahneman, 2011), or explicit and tacit knowledge (Nonaka, 1994).

process of making sense of what was going on and how it influenced the development.

Three examples will serve us to exemplify how we have used the framework as a sensitising device. There are other ways to use it as well.

Example 1: Use in a process management project

In a global process management project in a large multinational company there was constant confusion in the terminology. The aim was to develop a truly process-oriented organisation; in practice, however, much of the attention was drawn to process maps and documentation rather than true process development. Processes were often discussed as if they were the maps rather than what was going on in reality. The implication of this misconception was probably a less action-oriented project than intended, with major efforts to map everything rather than to drive improvement. We used the framework (Figure 3) to graphically clarify the difference between what is documented and spoken and what is actually done, and that confused language risks confusing people (e.g., between improving maps and improving action/results).

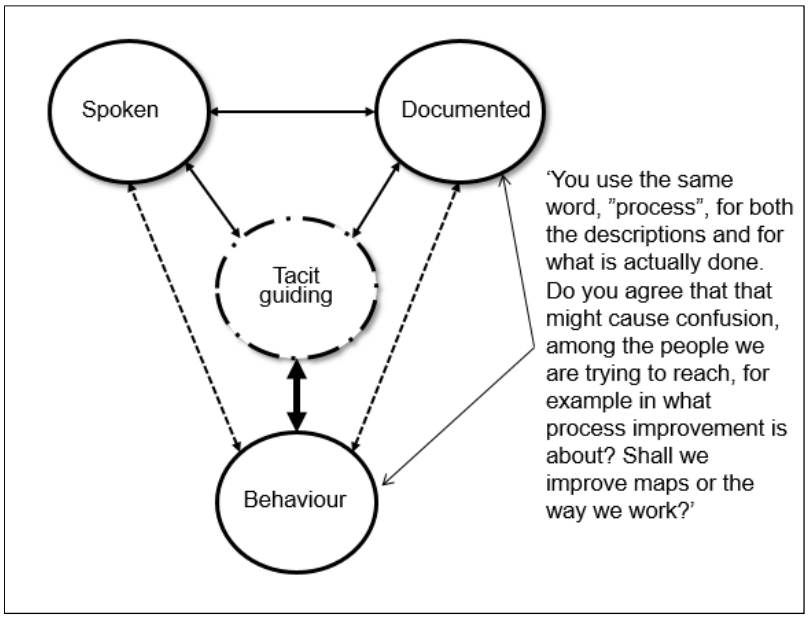

Figure 3 – Use in a process management project

Example 2: Use in discussing competence development

As part of a dialogue concerning the competence development at Effort Consulting, we used the framework (Figure 4) to clarify the competence development strategy. We agreed that classroom training is good, but even more important is teaming up in the projects and taking extra time for reflection and

learning during the actual work in action. In that way we can adjust behaviour according to our reflections and reach better tacit guided action supported both by what is spoken, what is documented and through behaviour. In doing so, we get a tighter coupling between reflection and action, which stimulates action learning and more efficient and effective development towards improved competence. We were able to graphically clarify what actually drives changed behaviour, that the links from Spoken and Documented (e.g. classroom training) normally are comparatively weak, and that reflection in action is a powerful way of learning.

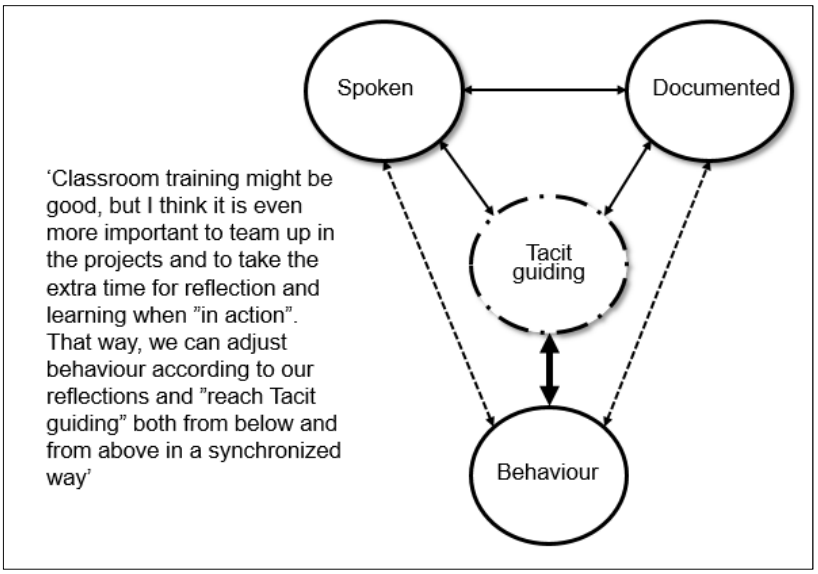

Figure 4 – Use in discussing competence development

Example 3: Use in discussing quality in theory and in action

In consultancy work, together with the top management team in a company within the marine industry, we needed to explain certain problematic patterns of organising that often take place in organisations. We were using the framework (Figure 5) when the CEO got inspired and explained that during daily operations they were in a combination of Tacit guiding and Behaviour, while when they were consciously discussing quality or operational development, they tended to work in the upper part of the model. A problem was that these two very different patterns of organising seldom met and complemented each other. Instead, the conscious work became ineffective, as it had minor influence on what actually guides work (Tacit guiding) and on work itself (Behaviour). In this example, the framework stimulated the CEO to express a core mechanism that was influencing the development of the firm. The framework offered a graphical background to the dialogue about the dynamic in the organisational system:

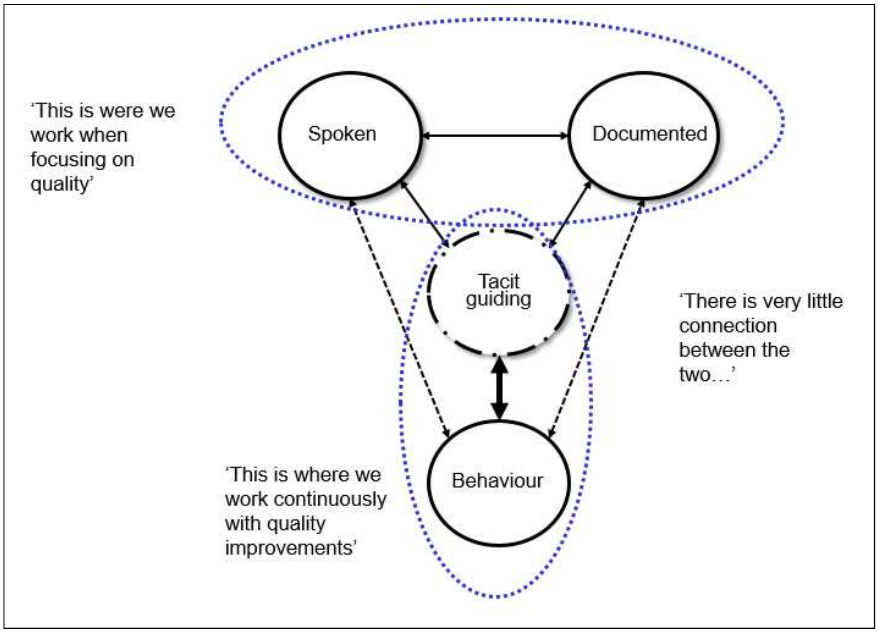

Figure 5 – Use in discussing quality in theory and in action

We (the authors) often observe how interviewees, customers, and co-workers get 'aha experiences' as we use the visual representation of the framework. This seems to be the case in particular for professionals with relevant experience in the management fields. Sometimes this happens at first glance with little or no explanation required. That it is so easy to relate to, at least for some professionals in the related fields, is also a sign of validity. The graphical framework functions as a sensitizing device by making them aware of disconnects between different components, and it aids in making tacit dimensions explicit and possible to scrutinize and develop. Thus, it connects the tacit knowledge to other more conscious aspects of an organisation, making it actionable.

The framework has also been used in empirical analyses of organisational change and its explanatory power has been validated by interviewees participating in the change processes: process management and quality systems (Marmgren, Alänge and Book, 2012); sustainability in product development (Alänge, Clancy and Marmgren, 2016); and sustainability strategies (Book, Marmgren and Gustafsson, 2014).

As indicated by the three examples above and the three references to empirical research, the framework can be applied in many different ways, including for analysing:

- Coherence and clarity of terminology used (e.g., concepts such as management innovation, process, management system; Example 1)

- Coherence of ideas and norms: both between explicit ideas (spoken and documented) and behaviour (Example 3) and coherence for the entire system (Alänge, Clancy and Marmgren, 2016)
- Dynamics of the system: what couplings are weak/strong, which norms govern the dynamics, which spoken or documented words, or actions are of special importance in carrying certain ideas (Alänge, Clancy and Marmgren, 2016)
- Dynamics of specific initiatives (Example 3; Marmgren, Alänge and Book, 2012)
- Interactions between (sets of) ideas or different change initiatives (Marmgren, Alänge and Book, 2012)
- Conditions for driving change projects and implications for how to adapt these to improve the likelihood of success (Alänge, Clancy and Marmgren, 2016)
- Alternative courses of action and comparing their consequences (Example 2)

6 THE POTENTIAL VALUE OF KNOWING AND USING THE CONCEPTUAL FRAMEWORK

The conceptual framework can be of value both for academics and leaders in organisations.

The value of knowing the framework[6] is primarily that it functions as a sensitising device (Weick, 1976) that 'opens new eyes' to more clearly differentiate between the parts of the model. This means that problematic patterns become apparent that otherwise might have been missed. This includes the common confusion in language between integral parts of an organisation (processes, culture, management systems) and their descriptions[7]. It also includes the related problem of disconnection between improvement of explicit thoughts and ideas (often with a lot of focus on documentation), and of improvement of action and results[8]. It can also foster an understanding of what drives change in behaviour, and that documentation, or even classroom training[9], have their limitations. In general, it gives a frame of reference for understanding, and talking about, how management ideas and documents interact with behaviour. The process of implementing new management initiatives is an important

[6] Knowing in this case, implies using it in your own thought processes (without drawing it), mostly initiated subconsciously, i.e., by System 1 (Kahneman, 2011).

[7] See Example 1 in the section 5 above.

[8] See Example 3 in the section 5 above.

[9] See Example 2 in the section 5 above.

example of when this is relevant, but it is also of continuous relevance as in, for example, the use of documentation for supporting/controlling operations, which is something most organisations have in common, to some extent.

The value of using the framework is both as a tool for analysis and as a tool for communication, or the combination of both. Maybe the most important value in using the tool is its communicative power. It is our experience that in a specific context, it can give immediate insights in line with the value of knowing the framework presented above[10]. This seems to be the case in particular for people with relevant work experience that they can relate to the framework.

Using the framework for analysis makes it possible to further develop the intuitive understanding from knowing the framework. The graphical nature of the framework makes it easier for a team to make an analysis together or to adjust it in discussions with other stakeholders at later stages, both of which will support joint ownership and thereby the action resulting from the analysis. As a tool for analysis, it can be used in many different ways including variations in:

- Scope: e.g., the entire organisation, a unit/group or a project
- Time: analysing an existing state (or a retrospective timeline) or a possible change/project
- Comparative or not: focusing on one scope or comparing different ones (e.g., units or projects)

A list of specific possible uses is given in section *5. The framework as sensitizing device and analytical tool* above, which also refers to articles and examples exemplifying these uses.

Knowing and using the framework also makes it easier to understand and use the general implications below, even though (in line with the framework) it is in no way a guarantee that they will be used.

7 MANAGERIAL IMPLICATIONS

One implication for leaders in all kinds of organisations, as indicated by the previous section, is that knowing and using the framework can be of considerable value. The framework, and the theory it builds on, also have general implications; in other words, these are independent of whether the framework is used or not. Some of the most important and clear implications are presented below.

[10] See Examples 1, 2 and 3 in the section 5 above.

Clarity in communication: Leaders should try to avoid using language that risks confusion between the different parts of the framework as with, for example, process (action) with documentation, as this risks directing focus to the wrong thing (normally documentation). A common example of this is how the term management system is used in relationship to certifications (e.g., ISO 9001) or legal demands where it, in our experience, often is equated with a document manual, giving the work with the standard/certification a focus skewed towards documentation.[11]

Understanding the dynamic of your organisation/system: Leaders should try to be aware of the relevant dynamics of their organisations. What is it that guides behaviour? Is it a strong company culture? Professional culture? Documentation? Shared values/idealism? Personal gains? Other things? It is probably a combination of factors, but understanding the most important ones will make it easier to see what strengths to build on (and not undermine) as well as what measures will probably be futile. One example of this is the importance of nurturing a valuable culture, which otherwise might be rapidly compromised by actions that in another organisation might be considered acceptable. Another example of this is the role of (different kinds of) documentation, where the same type of document might be effective in one organisation but ineffective in another.[12]

A related issue is **the importance of coherence**; in other words, it is important that what you say, write and do, will fit ('walking the talk'). Doing, in this case, also includes decisions on remuneration systems, or what is prioritized in meetings (e.g., management meeting agendas). If you as a leader say something is important in a speech and/or write a document about it (e.g., customer focus or gender equality), but do not prioritise discussing it in regular meetings and do not reward those who do prioritise it, this would be a clear lack of coherence. It would probably not only result in employees ignoring that spoken and/or written message, but also in weakening your ability to use those means for other messages. In a more general sense, lack of coherence risks confusing employees, damaging morale and weakening the ability to control/develop the organisation (rendering management efforts more inefficient).[13]

Implications for choosing a new concept or tools: The usage of new ideas like concepts and tools, sometimes packaged as a management initiative, is a common way to drive improvement. When choosing, the fit between the inherent logic of the new ideas and the dynamic of the organisation should be considered. Ideas generally need to be adapted to the local context in an iterative learning process, but if the fit is bad (but the ideas still considered useful), it is

[11] See Example 1 in the section 5 above.

[12] Alänge, Clancy and Marmgren (2016) use the framework to give an example of how different cultures can both be effective but require different management.

[13] Marmgren, Alänge and Book (2012), and Alänge, Clancy and Marmgren (2016) use the framework to show the importance of coherence.

recommended to start adapting them to the organisation's dynamic from the planning stage.

Understanding change as contextual and iterative: Since the planning and adaptation of the cultivation of a new management concept or tool is an iterative process, in itself adapting to an unfolding process of change[14], it is important to set and communicate a clear purpose as well as not plan actions in too much detail in a long-term perspective. This is the case, since you will probably wish to adapt the plan to what happens. It is, however, recommended that you have a clear structure to drive the change (e.g., responsibilities, meetings) in order to keep driving and updating the plan.

The role of documentation: New policy statements, written procedures, and the like, often do not seem to have the impact intended. This seems to be the case in particular when documents are written to assure compliance with external demands (e.g., legal demands, ISO standards), where the management's intentions with the documentation often are not clear (i.e., lacking coherence). Leaders should therefore be aware of the limited possibility of using documents to change behaviour, and that it depends on the clarity of the message they send (coherence) and the general role/importance of documentation in their organisation (i.e., knowing your system). This importance can be changed, but that is an issue of cultural change, normally quite a slow process. The above reasoning, however, applies more strongly to descriptive or 'passive' documentation; in other words, to documentation that describes how to do something (or what values to hold), such as procedures, process maps policy statements, and so forth. Cultivating change through using operative or 'active' documentation, which are both (sometimes necessary/required) tools to achieve your task (e.g., templates, IT systems etc.), has a much greater chance of success.

The importance of learning in action[15] and reflecting on action: Organisational development often focuses on learning through classroom training and documentation (books, procedures, etc.). This can be valuable, but including learning when doing will most likely increase the probability of changed behaviour. Learning when doing is something that happens subconsciously and continuously; however, what we refer to here is a learning that connects to the concepts and tools of organisational development (which could be something basic like a new written procedure or template). If you do not make this connection, you risk creating a theoretical organisational development in a conference room that has little impact on the actual development of how things

[14] To reach a significant change in 'Tacit guiding' with a management initiative, generally involves a context-specific iteration and learning between all parts of the model. What comes out in the end will be something specific to that context. Examples of this are given by Alänge, Clancy and Marmgren (2016), e.g., the adaptation of a tool for LCA to a different context.

[15] Reflection-in-action is an important part of individual skilled professional behaviour as argued by Schön (1983). Here, we emphasize that this individual and often subconscious process need to become an explicit and interactive reflective group process.

are done.[16] In order to make this connection, it is important to call attention to the concepts and tools when conducting normal 'operations' (e.g., in regular meetings, in projects, on a production line, etc.). It is also important to be able to reflect on the usefulness of the tools, concepts and/or behaviours, as well as how to change these in order to improve results.[17] To do this scheduled meetings (or parts of meetings) for reflection, preferably with an organisational development specialist present, could be used. Encouraging a culture of spontaneous reflection, and sufficient 'slack' in normal operations in order to facilitate this, should also be considered. One option to strongly support these kinds of reflection, is to have organisational development specialists 'embedded' in normal operations (e.g., on a project).

8 CONCLUSION

Leaders in today's society are facing complex challenges in the struggle for sustainable development in their organisations. New ideas are either forced by, for example, new requirements or changes in the law, or brought in by leaders in their efforts to stimulate development. Communication takes place on a variety of levels and through different channels. Not until behaviours are changed however, can the results and effects sought after become reality. We need tools to reflect on the process towards productive change with the aid of external or internal ideas that can facilitate success. This paper suggests a framework that has proven to function well in dialogues concerning such processes. We see great potential in developing the framework further and continue to apply it in various change projects.

For effective conscious quality oriented work to take place, all aspects of the model need to influence each other in a dynamic way that stimulates creative tension and development. The framework graphically highlights the relationship between explicit ideas (mainly manifested as spoken or documented) and 'tacit guiding' ideas, and that the latter is what largely controls action. It also implies that for new explicit ideas to become effective, which is normally the purpose of improvement initiatives, they have to become naturalised; in other words, they need to become part of the tacit guiding ideas. This is often quite difficult to achieve, as shown by the fact that most improvement initiatives tend to not give the intended results.

[16] See Example 3 in the section 5 above.

[17] See Example 2 in the section 5 above.

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