e-Shop Visitors' Burstiness as a Predictor of Performance
The Case of eBay

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Keywords: Binary Customer Behaviour, e-Shop Visitor, Buyer, Burstiness, Frequency, Performance in e-Business, Selling/Buying, e-Business Process.

Abstract: Burstiness serves as a predictor of performance in the management sciences. However, burstiness has not been examined as a predictor of performance in e-business process. The research question is as follows: Does burstiness serve as the predictor of performance in e-business process? The aim of the research is to analyse burstiness as a predictor of performance in e-business process underpinning elaboration of a new research question on burstiness functions. The meaning of the key concepts of *burstiness* and *performance* is studied. Moreover, the analysis demonstrates how the key concepts are related to the idea of *e-business process* and shows a potential model for development, indicating how the steps of the process are related following a logical chain: conceptual framework → empirical analysis →conclusions. The results of the research show that e-shop visitors' burstiness does not always serve as the predictor of item on-line selling/buying. The novel contribution of the paper is revealed in the newly created research question: What are reasons that e-shop visitors' burstiness does not serve as the predictor of performance in e-business process despite the common background such as social grounding in both sciences, namely management and e-business? Directions of further research are proposed.

1 INTRODUCTION

Currently, the phenomenon of burstiness is in the research focus as burstiness is used

- On the one hand, to designate the tendency in the field of investigation (Pierrehumbert, 2012), and
- On the other hand, to permanently optimize the flow of e-business process in order to increase the profit (Ahrens et al., 2016).

For designating the tendency in a field of scientific investigation, burstiness functions as a predictor of performance in the management science (Riedl and Woolley, 2017). For the optimization of the flow of e-business process, burstiness acts as a characteristic of the flow of e-business process. This finding as well as common background such as social grounding in both sciences, namely management and e-business, allow identifying the functions of burtsiness shown in Table 1.

Table 1: Function of burstiness.

Phenomenon	Scientific direction	Function
Burstiness	Management	Predictor
	e-Business	Characteristic

Table 1 demonstrates that burstiness has not been examined as a predictor of performance in e-business process. However, burstiness serving as a predictor of performance in e-business process could assist in optimizing the flow of e-business process in order to increase the profit (Ahrens et al., 2016).

The research question is as follows: Does burstiness serve as the predictor of performance in e-business process?

The aim of the research is to analyse burstiness as a predictor of performance in e-business underpinning elaboration of a new research question on burstiness functions. The meaning of the key concepts of *burstiness* and *performance* is studied. Moreover, the analysis demonstrates how the key concepts are related to the idea of *e-business process*

and shows a potential model for development, indicating how the steps of the process are related following a logical chain: conceptual framework → empirical study →conclusions.

2 CONCEPTUAL FRAMEWORK

The present research adopts the definition of burstiness that refers to burstiness in human behaviour as e-shop visitors who are human beings are the focus of the present investigation. Therein, burstiness means periods of very high activity that are followed by rest periods (Gandica et al., 2016). The period of high activity means a period where at least one activity is performed, and the rest period is identified as a period without any activity implemented (Ahrens et al., 2015).

A typical scenario in which burstiness could be considered as a predictor of performance in e-business process can be described as following: every day lots of items are offered in on-line shops. Many of these items receive "viewed". Later some of the viewed items are sold/bought. The act of selling/buying is understood as e-business process. By e-business process, the process of buying and/or selling of goods and/or services through Information and Communication Technologies (ICT) is meant (Ahrens and Zaščerinska, 2016). The act of selling/buying is realized as performance in the present research. Then, on-line viewing an item is determined to be the predictor of selling/buying or, in other words, performance. Understanding of performance and its predictor described in the present paper extended the definition of e-business process from the act of selling/buying only to the e-business process of two phases, namely

- Phase 1 Viewing and
- Phase 2 Selling/Buying.

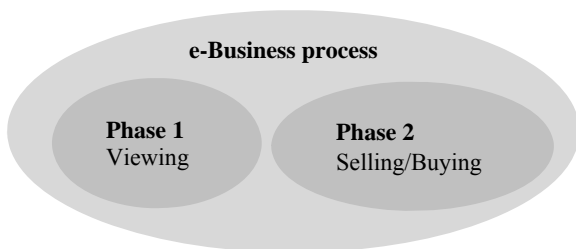Figure 1 reveals the two elaborated phases of e-business process.

Figure 1: Two phases of e-business process.

A customer is discussed within the paradigm of binary customer behaviour as illustrated in Figure 2 (Ahrens and Zaščerinska, 2016). If e-business process ends with a purchase, the customer becomes a buyer. In turn, by e-shop visitor, any customer who seeks and examines a product without buying it is understood (Ahrens and Zaščerinska, 2016).
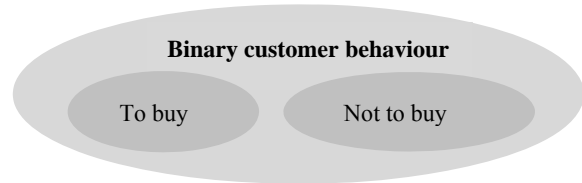

Figure 2: Elements of customers' binary option.

Table 2 describes the newly elaborated two phases' e-business process.

Table 2: Description of the two-phases' business process.

Phase of e-business process	Focus of the phase of e-business process	Participants in the phase of e-business process	Function of burstiness in the phase of e-business process
Phase 1	Viewing	e-shop visitors	Predictor of performance (selling/buying)
Phase 2	Selling/ buying	Buyers	Characteristic of performance (selling/buying)

The focus of the present research is put on Phase 1 Viewing of the e-business process. In Phase 1 Viewing burstiness serves as the predictor of performance. Burstiness is closely inter-connected with frequency (Pierrehumbert, 2012) as depicted in Figure 3.
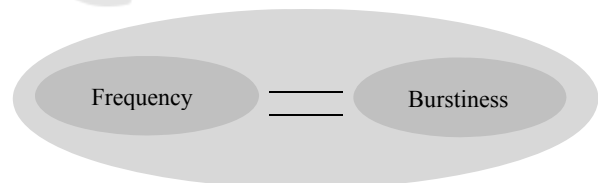

Figure 3: The inter-relationship between frequency and burstiness.

Traditionally, a frequency is defined as the number of times a given datum (views of an item by e-shop visitors in the present paper) occurs in a data set (Dean and Illowsky, 2010). Consequently, frequency is regarded in terms of a number of item's views by e-shop visitors in the present work.

Analysis of the research results shown by Pierrehumbert (Pierrehumbert, 2012) allows

determining that frequency and burstiness are found to be inter-related in order to quantify burstiness (Pierrehumbert, 2012). Then, frequency of e-shop visitors' views of an item means e-shop visitors' burstiness in the present investigation.

For the purposes of the present work, frequency is determined to be an indicator of burstiness as shown in Table 3.

Table 3: Indicator of burstiness as the predictor of performance.

Phenomenon	Indicator
Burstiness	Frequency

3 EMPIRICAL ANALYSIS

The present part of the paper demonstrates the design of the empirical study, results of the empirical study and findings of the study.

The design of the present empirical study comprises the purpose and question, materials and methodology of the present empirical study.

The empirical study was aimed at evaluating e-shop visitors' burstiness as the predictor of item on-line selling/buying in Phase 1 Viewing of e-business process.

The case study research has been applied as "case studies […] are generalizable to theoretical propositions and not to populations or universes. In doing a case study, your goal will be to generalize theories (analytical generalization) and not to enumerate frequencies (statistical generalization)" (Yin, 2003, p. 10). Case study research is a qualitative research design (Kohlbacher, 2005). The exploratory type of the case study research has been applied (Zainal, 2007) in the present empirical study as case studies have an important function in generating new research questions, hypotheses and building theory (Kohlbacher, 2005). Exploratory case studies set to explore any phenomenon in the data which serves as a point of interest to the researcher (Zainal, 2007). The exploratory methodology proceeds from exploration in Phase 1 through analysis in Phase 2 to hypothesis/research question development in Phase 3.

The qualitatively oriented empirical study allows the construction of only few cases (Mayring, 2004). The cases themselves are not of interest, only the conclusions and transfers we can draw from these documents (Flyvbjerg, 2006). Selecting the cases for the case study comprises use of information-oriented documents, as opposed to random documents (Flyvbjerg, 2006). This is

because an average case is often not the richest in information. In addition, it is often more important to clarify the deeper causes behind a given problem and its consequences than to describe the symptoms of the problem and how frequently they occur (Flyvbjerg, 2006).

Interpretive research paradigm was used in the present empirical study. The interpretive paradigm aims to understand other cultures, from the inside through the use of ethnographic methods such as informal interviewing, participant observation and establishment of ethically sound relationships (Taylor and Medina, 2013).

For the empirical study's purposes, eBay has been chosen as eBay provides reports on activities that were carried out that can be considered as naturally occurring data set.

eBay is the global online marketplace. (Comberg and Velamuri, 2017). Founded in 1995, eBay quickly became popular for its innovative auction style shopping format (Comberg and Velamuri, 2017). In 1998, eBay was already a publicly traded company with over two million registered users and over $47 million in annual revenue (eBay Inc., 1999). It should be noted that after an item has been sold eBay offers to evaluate the item quality and delivery. This evaluation is considered as Phase 3 in e-business process as shown in Figure 4.
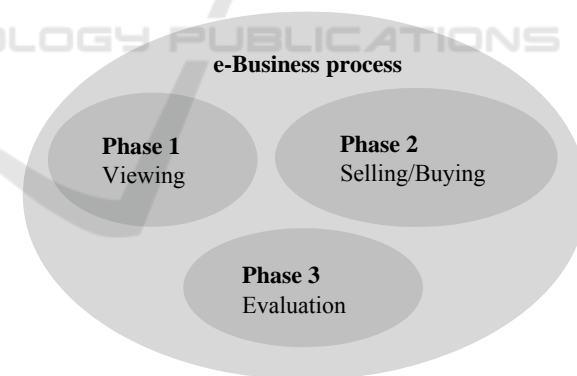

Figure 4: Three phases of e-business process.

Table 4 describes the newly elaborated three phases' e-business process.

The empirical study's question was as follows: Does e-shop visitors' burstiness serve as the predictor of item on-line selling/buying?

The present empirical study was carried out from December 2016 to January 2017. Analysis of statistical documents provided by eBay to an account holder was implemented.

Table 4: Description of the three-phases' business process.

Phase of e-business process	Focus of the phase of e-business process	Participants in the phase of e-business process	Function of burstiness in the phase of e-business process
Phase 1	Viewing	e-Shop visitors	Predictor of performance (selling/buying)
Phase 2	Selling/ buying	Buyers	Characteristic of performance (selling/buying)
Phase 3	Evalua-tion	Buyers	Predictor of performance (selling by owner who sold the item)
			Characteristic of performance (selling by owner who sold the item)

Analysis of documents of 10 items listed for sale on eBay within December 2016 - January 2017 on an account holder was carried out. Each of 10 items is usually offered for selling during one week or seven days. During this period, e-shop visitors can view an item of their interest and get this item via auction-style buying process. Table 5 demonstrates the summary of the observed results of 10 items listed for sale on eBay on an account holder.

Structuring content analysis (Mayring, 2004) shows that two items, namely hand-made candlestick (14 views) and cocktail set (6 views) had a higher number of views and, consequently burstiness, in comparison to paper shredder (3 views), tea metal boxes (empty) (4 views) and stationary telephone for elderly people (3 views). However, all the five items have been sold despite a different number of views and, consequently, level of burstiness.

On the other hand, three items, namely hand-made candlestick (14 views), work trousers (34 views) and UK adapter (17 views), had a higher level of burstiness in terms of number of views by eBay shop visitors. However, these three items had not been sold/bought. On contrary, three other items, namely paper shredder (3 views), tea metal boxes (empty) (4 views) and stationary telephone for elderly people (3 views) had a lower level of burstiness. Against this background, all the thee items had been sold/bought.

Table 5: Results of document analysis of 10 items listed for sale on eBay on an account holder.

Nr.	Item	Frequency of views	Sold/ Not Sold
1	Two loudspeakers	7 times viewed	Not Sold
2	A wine set in a box	5 times viewed	Not Sold
3	Hand-made candlestick	14 times viewed	Not Sold
4	Work trousers	34 times viewed	Not Sold
5	UK adapter	17 times viewed	Not Sold
6	Hand meat grinder	11 times viewed	Sold
7	Paper shredder	3 times viewed	Sold
8	Tea metal boxes (empty)	4 times viewed	Sold
9	Cocktail set	6 times viewed	Sold
10	Stationary telephone for elderly people	3 times viewed	Sold

Summarizing content analysis (Mayring, 2004) of the data reveals that e-shop visitors' burstiness does not always serve as the predictor of item on-line selling/buying.

5 CONCLUSIONS

The theoretical findings of the present research allow identifying such a function of burstiness in e-business process as the predictor of performance. Against this background, the empirical findings of the research allow drawing the conclusions that e-shop visitors' burstiness does not always serve as the predictor of item on-line selling/buying.

The theoretical analysis also allows defining frequency as an indicator of burstiness. The theoretical investigations contributed to the development of three-phase e-business process, namely

- Phase 1 Viewing;
- Phase 2 Selling/Buying; and
- Phase 3 Evaluation.

The following research question has been formulated: What are reasons that e-shop visitors' burstiness does not serve as the predictor of performance in e-business process despite the common background such as social grounding in both sciences, namely management and e-business?

Validity and reliability of the research results

have been provided by involving other researchers into several stages of the conducted research. External validity has been revealed by international co-operation as following:

- the research preparation has included individual interdisciplinary consultations given by other researchers,
- the present contribution has been worked out in co-operation with international colleagues and assessed by international colleagues, and
- the research has been partly presented at international conferences.

Therein, the findings of the present research are validated by other researchers.

The present research has limitations. The inter-connections between *e-business process, binary customer behaviour, the e-shop visitors' burstiness,* and *frequency* have been set. Another limitation is the empirical study based on one case only, namely eBay. Therein, the results of the study cannot be representative for the whole area. Nevertheless, the results of the research, namely the three phases of the newly elaborated e-business process, namely Phase 1 Viewing, Phase 2 Selling/Buying and Phase 3 Evaluation, may be used as a basis of analysis of burstiness in e-business process. If the results of other cases had been available for analysis, different results could have been attained. There is a possibility to continue the study.

Investigation of further functions of burstiness are in the focus of future research. Further research tends to search for other indicators of e-shop visitors' burstiness that can serve as the predictor of performance in e-business process. Empirical studies on burstiness in a variety of e-business sectors are to be implemented. The search for relevant methods, tools and techniques for the analysis of burstiness in e-business process is proposed. A comparative research on analysis of burstiness in other scientific fields could be carried out, too.

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