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Examining Operational Wastes within Greek Banking Operations

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Abstract

In order to address operational effectiveness in the banking sector caused by the 2008 global economic crisis, this study examines the nature of operational wastes that exist within four large Greek banks. A Delphi study was undertaken with ten managers and ten employees. The waste of underutilised people is found to be the dominant form of waste present and affecting the efficiency of banking operations. This has implications for managers of banking operations needing to address efficiencies in an increasingly competitive global economic environment. The paper also highlights the drawbacks of analysing typologies of waste across organisations and industrial sectors.

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Introduction

The 2008 global economic crisis was caused by a complex combination of rapid financial expansion, credit boom, increasing asset prices, and financial liberalisation and deregulation (Claessens and Kodres, 2014). Not only has this generated long-term economic uncertainty, bailouts (Kouretas and Vlamis, 2010) and a reshaping of financial institutions (HBA, 2017, p2), but it has led to a downfall in operational effectiveness across the banking sector. Argyrou and Kontonikas (2010) described the effect as being like a contagion that had spread across Europe. In a review of the overall banking efficiency in 25 EU countries for 2005-2006 (pre-crisis period) and 2009-2010 (post-crisis period), Alzubaidi and Bougheas (2012) concluded that there had been an average decrease in efficiency of 12%. In the cases of Greece, Belgium and Denmark the decrease was even larger. For instance, among several such studies of efficiency within the Greek banking sector (Tsionas et al., 2003; Rezitis, 2006; Aggelopoulos et al. 2010; Alzubaidi and Bougheas, 2012), Varias and Sofianopoulou's (2012) study of the 19 biggest Greek commercial banks in 2009 found that that 68.42% of them were inefficient.

'Lean' tools and techniques have been the cornerstone of operational improvements for several decades (White and James, 2014; Syddell, 2005; Verstraete, 2004; Alavi, 2003; McCurry and McIvor, 2001; Mason-Jones et al., 2000) typically through the identification and elimination of non-value adding activities or 'waste' (Andersson, Eriksson and Torstensson, 2006). Many manufacturing industries have successfully adopted these techniques in order to improve operational efficiencies, including automotive, aerospace, information technology and electronics (Sohal and Egglestone, 1994; Doolen and Hacker, 2005; Tomas and Antonio, 2006; Wong et al, 2009; Neumann et al, 2012). However, their uses are not limited to the manufacturing sector and they have also been adopted in the public sector (White and Cicmil, 2015; Bateman, Hines and Davidson, 2014; Radnor and Walley, 2010), education (Emiliani, 2004), call centres (Piercy, Rich, 2009), healthcare (McCann, Hassard and Granter, 2015; McIntosh, Sheppy and Cohen, 2014; Esain, Williams and Massey, 2010), and, apposite to the context of this study, they have been employed in the financial services sector (Ndaita, Gachie and Kiveu, 2015; Leyer and Moormann, 2015; Delgado, Ferreira and Branco, 2010).

Recognising the current inefficiencies in the banking sector, particularly within Greece, and the importance of waste elimination to improve operational performance, this study examines the nature of operational wastes that exist within the banking function. This is achieved through a Delphi study of managers and employees of four large Greek bank. This is one of very few studies that examines the nature of operational waste within the service sector. The findings indicate that: Managers and employees consider the waste of underutilised people as having a significant influence on the efficiency of the banking sector. It is important to interpret studies of waste within a given organisational context as interorganisational and inter-sector comparisons are otherwise difficult to make. Whilst studies of typologies of waste are a useful, quantitative analytical methods may be more informative for managers wishing to address operational wastes.

The paper is structured as follows: firstly a review of the studies of waste is made. Following this the research methodology is detailed before the analysis and discussion are presented. It finishes with concluding statements and suggestions for future research.

Literature Review

Waste has been widely defined as the use of resources for any means other than the creation of value for a customer and is therefore a target for reduction and elimination throughout all operations (Womack et al., 1990; Liker, 1996; Hines and Rich, 1997; Russell and Taylor, 1999; Conner, 2001; Flinchbaugh, 2001; Rawabdeh 2005; Jimmerson et al, 2005). Canel et al., (2000, p. 51) proffer a useful working definition of waste as 'anything other than the minimum amount of equipment, materials, parts, space and worker's time, which are essential to add value to the product or service'.

Taichi Ohno (1988) is regarded as the father of the Toyota Production System, one of the most celebrated integrated systems for the continual improvement of manufacturing efficiency and effectiveness through the identification and reduction of waste. He categorized waste into seven types: defects, overproduction, inventory, over-processing, unnecessary motion, transportation (conveyance), and waiting.

Defects: refers to any product or service the customer is unwilling to accept (Gopinath and Freiheit, 2012). The crucial issue for a business is the identification of defects in order to take steps to then reduce or eliminate them. Undetected defects incur time and cost penalties. In a study of banking, Bicheno (2008) divided defects into two categories: internal and external failure. The former could be the wrong details being entered on a credit card or sums transferred to the wrong bank account; the latter a failure that invokes warranty, or repairs to software or hardware of bank system.

Overproduction: refers to making a product before a demand exists and which 'leads to excessive work in-progress stock which result in the physical dislocation of operations with consequent poorer communication' (Taylor and Brunt, 2001, p.28). Reducing or preventing overproduction through better alignment with demand, represents savings in terms of labour and material costs (Yu-Lee, 2011). Excluding defects, Sowards (2017) describes overproduction as 'the mother' of all other wastes.

Inventory: refers to any materials an organisation holds to satisfy internal or external customer demand (Mangan et al., 2012). The crucial characteristics of it rests on the strategic decisions regarding what to stock, how much to stock, and where to stock (Islam et al., 2012). Unnecessary inventory in the form of finished or semi-finished products or components creates waste from storage costs and limits business competitiveness (Bicheno, 2008; Damrath, 2012).

Overprocessing refers to redundant effort and unnecessary extra steps (Ortiz, 2009) that leads to undertaking more fabrication or assembly line work than is necessary to meet customer needs (Yu-Le, 2011). Overprocessing can be unnecessary reviews or requests for signatures or activities that leads to additional consumption of parts and raw materials per unit of production, increased waste, energy usage, and emissions (Hallam and Contreras, 2016). An increase of flow lengths and bottlenecks that affect the efficiency of operations (Bicheno and Hines, 2004).

Motion: can refer to both human activity and organisational layout and is the unnecessary movement of people and equipment often derived from poor workplace organisation (Sullivan et al., 2002). Detailing the specifics of motion associated with waste Okpala (2014) suggests that any bending, lifting, stretching and kneeling that is not undertaken without reference to the application of ergonomics can represent not only a monetary and equipment cost (from wear) but an unnecessary stress on personnel. Through addressing and monitoring

movement, managers and employees can identify needless activity and better utilise their time to serve more customers (Womack, Jones and Ross, 1990).

Transportation (Conveyance): is a necessary element of business operations; however, the transfer of materials, components, work in progress or finished products from places of work, warehouses or suppliers between processes does not add value (Chomatowska and Żarczyńska- Dobiesz, 2014). Moving products more than is required slows output, consumes labour and can consume finite equipment capacity (Yu-Lee, 2011)

Waiting: refers to any resources or material staying idle during working hours (Gopinath and Freiheit, 2009). Waiting reduces customer satisfaction and increases time, quality, productivity and operations cost (Womack and Jones, 2003). From a customer point of view, waiting is boring, frustrating and irritating (Hui and Tse 1996; Katz et al., 1991) and represents a major factor in customer satisfaction and business competitiveness (Bicheno, 2008). The perception of the service can be affected by aspects such as waiting time and the length of queues and can generate a negative view of the organisation that ultimately causes the loss of consumers (Taylor, 1994; Hui and Tse, 1996; Bielen and Demoulin, 2007). Frustration caused by waiting is not restricted to face-to-face encounters, Demoulin and Djelassi (2013) note that slow online banking systems can have a similar effect on evaluation of service.

It can be seen that the majority of research around waste identification and elimination has emanated from the manufacturing sector. Typically, it is seen to add cost in the form of inventory, set-up, scrap and rework (Svenssen, 2001) while Wojakowski and Warzolek (2017) noted that 60% of waste is generated by waiting, over processing and motion. Wood (2004) however, warns that businesses have traditionally concentrated on improving labour productivity but that in a typical process 95% of the day-to-day activities are non-value adding and therefore represent a greater proportion of total work that requires examination.

Much of the research into operational waste has been influenced by Ohno's seminal typology (see Table 1). These examinations of the seven wastes indicate that there are differences in the occurrences of wastes between primary and secondary manufacturing sectors (for example Esain, 2000 and Rawabdeh, 2005) and between service and manufacturing sectors (for example Esain, Griffiths and Hines, 2001 and Goriwondo, Mhlanga and Marecha, 2011). El-Namrouty and AbuShaaban's (2013) work even indicates that there can be differences within geographical regions. Collectively they point toward the importance of examining the prevalence of wastes within specific circumstances and the usefulness of Ohno's categorization of the seven types of waste in framing such an examination.

Insert table 1 Here

Methodology

In order to examine the types of waste that exist within Greek banking operations this research employs a Delphi study (Kosow and Gassner, 2008; Skulmoski, et al., 2007; Linstone and Turoff, 197; Dalkey and Helmer, 1963). The Delphi technique pioneered by Helmer and Dalkey in the 1950s generally uses a group of people who have a stake or interest in the research idea to generate and choose a more defined research idea (Robson, 2002).

The technique has been used in studies across a wide variety of sectors including cryptocurrency (White, 2017), business improvement (Harer, 2003; Ray and Sahu, 1989), employee and public relations (Watson, 2008; Wiggington, 1979), knowledge management

(Scholl, et al., 2004), marketing (Knutson, et al, 2004; Larreche and Montgomerey, 1977), productivity management (Ray and Sahu, 1990), project management (Brill, et al., 2006), supply chain management (Melnyk, et al., 2009; Lummus, et al., 2005), tourism (Muller, 2005; Yong, Keng and Leng, 1988), social enterprise (White et al., 2017) and information systems (Hong, et al., 2015; Huang, et al., 2013; Liu, et al., 2010; Bradley and Stewart, 2003; Kell, et al., 2002; Schmidt, et al., 2001; Koskiala and Huhtanen, 1989).

It is an effective technique for combining deductive and inductive approaches to make robust investigations into complex phenomena (Kosow and Gassner, 2008; Petry, 2007; Skulmoski, 2007; Yin, 2003; Rowe and Wright, 1999; de Vos, 1998; Mitchell, 1992; Paliwoda, 1983; Jick, 1979). However, it does present practical challenges that comprise the selection of suitable participants, retaining participant commitment and the utilisation of appropriate analytical instruments (Makkonen, et al., 2016; Gary and von der Gracht, 2015; Okoli and Pawlowski, 2004; Wentholt and Frewer, 2010; Brill, et al., 2006; Paliwoda, 1983).

The approach taken in this study comprises a two-round study, incorporating descriptive statistics and Kendall's W measure of concordance (Gary and von der Gracht, 2015; Boulkedid et al., 2011; Wentholt and Frewer, 2010; Watson, 2008; Petry, et al., 2007; Okoli and Pawlowski, 2004; Scholl, et al., 2004; Harer, 2003). Kendall's W has been widely used in many Delphi studies including cryptocurrency (White, 2017), construction (Idrus and Newman, 2002), education (Manalo, 2013), human resource management (Papavasileiou and Lyons, 2015), information system development (Shang, 2012), performance management (Rashvand and Majid, 2014), retailing (Rupesh and Narayanan, 2016), risk management (Bessette, Campbell-Arvai and Arvai, 2016) and social enterprise (White et al., 2017). Values of Kendall's W range between 0 (no agreement) and 1 (complete agreement). The interpretation of intermediate measures of W remain moot, some considering values over 0.63 to be moderate degrees of concordance (Hays, 1998) while others consider values of between 0.5 and 0.7 indicate moderate concordance (Schmidt, 1997). When measures of concordance are employed, it is more appropriate to utilise them as inter-round comparators rather than absolute measures since it is not necessarily the purpose of Delphi studies to attempt to reach consensus (Engelke, Mauksch, Darkow and von der Gracht, 2016).

The Delphi panel consisted of ten managers and ten employees (see Table 2 for participant details) of four large Greek banks (see Table 3 for bank details). In order to protect the identities of the participants and the banks within which they work, the specific details of each have been changed (participants are coded 'M' for Managers and 'E' for Employees and numbered 1 to 10). To further protect confidentiality all figures have been approximated. Table 2 outlines the demographic profile of the participants and the banks.

Typical response rates in research vary between 3% and 50% (Ranchord and Zhou, 2001). The face-to-face distribution and collection of the survey instrument resulted in 100% participation across both rounds (Collis and Hussey, 2009). Participants were asked to rank the seven wastes that occurred in banking operations in order of importance. In order to improve the validity of Delphi studies they may be combined with qualitative data capturing methods (Engelke, et al., 2016; de Vos, 2005; Rowe and Wright, 1999). This study employed interviews with managers of each of the four banks between Round 1 and Round 2 in order to gain a richer insight into the banking operations and the types of waste that are typically encountered (Denscombe, 2010; Fox, 2009). This data was used to refine the Delphi survey

and participants were asked to re-rank the types of waste that occurred in banking operations in Round 2.

Insert Table 2 Here

The mean age of the sample is 46.5 and the length of service is 21.55 years, which suggests a high level of experience related to the operation of banking systems and customer interaction amongst the sample. Greek banks have historically employed more males than females, especially in management positions and so the split between the genders in the sample is not unusual.

Insert Table 3 Here

ANALYSIS and DISCUSSION

In Round 1 the Employees returned a very low degree of concordance (W=0.129) in their assessment of the order of importance of the seven forms of waste. The Managers returned a similarly low degree of concordance (W=0.198) in their interpretation. Overall, the combined rankings of the Employees and Managers returned W=0.127.

Table 4 presents the relative order of importance of each of the wastes in Round 1, as perceived by the Employees group, the Managers group, and their combined rankings. It is interesting to note the marked difference in the Employees' and Managers' appreciation of the importance of Overproduction and Inventory. The Employees regarded Overproduction as a minor issue, but Inventory as a significant problem, whereas the Managers consider Inventory to be insignificant but Overproduction to be their second most important concern. This is curious since both of these forms of waste are highly interrelated: Overproduction leads to an increase in Inventory.

Insert Table 4 Here

After the first-round questionnaires were collected, two of the ten managers noted that the efficiency of banking operations relies on how the bank appoints the right person in a position. Some literature has examined non-value adding activities in other sectors and discovered further forms of waste. Womack and Jones (1996) for instance add an eighth waste of 'making the wrong product efficiently'. To this, Bicheno and Hines (2004) add a further three comprising the waste of untapped human potential, the waste of inappropriate systems and the waste of energy and resources. Untapped human potential refers to those talented employees who possess a high degree of experience or skills but who do not give fully to the organisation due to a lack of commitment because of miscommunication amongst workers, or because they have been placed in a suboptimal position within the organisation (Johnston, 2008). An inappropriate system refers to those such as MRP or ERP, which may cause problems with service flow, for example generating extra paperwork, which increases costs through unnecessary motion (George, 2003). In recognition of this, the eighth waste of 'Unutilized People' was added in the second-round questionnaires.

In Round 2 the Employees returned a higher degree of concordance (W=0.32) than that returned in Round 1 (W=0.129). Similarly, the Managers also demonstrated a higher degree of concordance (W=0.37) than in Round 1 (W=0.198). The overall degree of concordance was also considerably higher (W=0.3).

Table 5 presents the relative order of importance of each of the wastes in Round 2, as perceived by each individual group and their combined rankings. It is most interesting to note the greater similarity in each group's perceptions of the relative importance of each form of

waste: as an increased measure of concordance would suggest. However, what is not indicated by the mere comparison of measures of W is the nature of the changes that have taken place. It is significant that the Employees' appreciation of the relative importance of each of the wastes has changed very little between rounds whereas the Managers' relative rankings have changed considerably: in particular, the perceptions of the significance of Overproduction and Inventory are more in accord.

It is also encouraging to note that in Round 2 both Employees and Managers recognised Underutilized Resources as a significant source of waste that exists, however, it is correspondingly disappointing to note that all staff appreciate that their own talent is not leveraged to its maximum capability. Under considerable pressure to reduce spending on operations and offer the customer greater value for money it falls to those who manage the banking system to seek to reduce instances of waste and a direct and effective way of doing this is to concentrate efforts on making sure that the personnel employed by the bank are effectively utilized.

Insert Table 5 Here

Inspection of the individual responses indicates that participant E6's rankings changed considerably between rounds. Indeed, the sum total of their rankings for each of the wastes changed by 11 points. In comparison, the other Employees' rankings changed between 0 and 6 points between rounds. Kendall's W for Round 1 and eliminating the rankings provided by participant E6, returns W=0.17. This suggests that E6's responses are somewhat anomalous in Round 1 (compared to the rest of the participant group). However, a similar analysis of Round 2 results, removing the responses for E6, does not produce a comparable change in Kendall's W (with E6 W=0.324, without E6 W=0.327) and this indicates that E6's results are harmonious with the remainder of the group in Round 2.

Similar inspection of the variance in the Managers' rankings between rounds indicates that their rankings changed considerably. The minimum change in rankings was 5 points (for participants M2 and M7), whereas M1 changed their rankings by the most (10 points), and participants M9, M10 and M5 each changed their rankings by 9 points. It is this considerable shift in appreciation of the importance of each of the wastes that results in their views becoming more aligned with those of the Employees in Round 2 of the study. This is important as firstly it (problematically) suggests that there is a tacit difference between Employees' and Managers' understanding of the types of wastes that are prevalent, and secondly it (constructively) indicates that Managers' perceptions are highly fluid and subject to change upon reflection.

In the absence of any other studies that make an examination of the forms of waste that are present within the banking sector it is necessary to make comparison to those studies that have been undertaken in other industries and sectors (Table 1). Generally, the managers and employees of Greek banks highlighted the issues of defects, overproduction and waiting, and this broadly reflects the situation in other sectors. There are some exceptions, for instance, overproduction, as one would expect, is not a pertinent issue in a job-shop where production is not arranged around batched work, similarly, bread manufacturing may be arranged upon a continuous process and therefore not be subject to problems of overproduction. Interestingly, in the only other examination of a service industry (procurement services), the perception of the importance of the waste of defects differs markedly. Making a critique of this difference is impossible without detailed knowledge of the systems of work that are employed: the procurement services function may for instance employ automated electronic procurement as part of an enterprise-wide management information system, in which case the chance of

defects arising may be negligible (Chaffey and White, 2011). It must also be considered that unlike procurement, banking operations are customer-facing. Simple acts such as the entry of wrong data or payment to the wrong vendor have great impact in by undermining customer satisfaction and in some circumstances can lead to Government intervention, reference to an ombudsman and subjection to audit. It is not unreasonable then that managers and employees should highlight the importance of defects against a background such measures and during a time when national and international competition for banking services is high.

Conclusion

While some studies have examined the overall efficiency of the Greek banking sector, to date, none have explored the nature of the inefficiencies that manifest as waste. This study addresses this by undertaking a Delphi study of manager and employee perceptions of operational waste within several large Greek banks. This research was undertaken at a time when the Greek banking sector was taking great steps to present a more efficient and effective service to both their international and national customers and to provide reassurance that they had addressed many of the criticism that had been raised by those such as the IMF and the World Bank. This study has highlighted that managers and employees consider the waste of unutilized people as having a significant impact on the efficiency of banking sector, something that has rarely been noticed in other industries.

Many studies of waste have adopted the 'classical' seven wastes that were originally proposed by Taichi Ohno. While these are useful aids for the identification of operational inefficiencies their application is more difficult in service environments. Future work could attempt to develop service-based definitions and descriptions of each of the types of waste. In addition, future studies of waste, and practical initiatives to examine operational inefficiency by practicing managers, should be mindful of the extended typologies of waste that exist, in particular those that comprise that of 'underutilized resources' in order to ensure that this important and most valuable asset is not neglected.

This study indicates that it is imperative to fully understand the operational context of the research site in order to successfully interpret the results. For instance, the rank order of the importance of wastes in Greek banks closely resembles those found in some manufacturing environments but varies from those found in service environments where it may be assumed that there would be a greater degree of commonality. This raises questions over the comparability of analyses of wastes between sectors and even between different parts of a single organisation. This has practical implications for managers that are attempting to benchmark their performance both inter- and intra-sector. We proffer that this highlights the importance of the fundamental message of lean that is 'continual improvement'. While analyses of types of waste may be useful indicators of the nature of the operational inefficiencies that require attention, quantitative measurements of wastes through techniques such as process mapping may be more valuable in allowing comparative analyses between sectors and the objective assessment of the effectiveness of intervention strategies (White and Cicmil, 2016; White and James, 2014).

The generalisability of this study's findings is limited by the relatively small sample size that is necessary to practicably operationalise the Delphi method. However, the results are based upon data from four of the largest Greek banks and therefore can be said to have reached meaningful conclusions. Future research could adopt survey instruments in order to garner results from a larger sample.

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Table 1: Waste Ranking from Various Industries

	Wastes						
	Overproduction	**Waiting**	**Transportation**	**Over processing**	**Inventory**	**Motion**	**Defects**
Industry	**Rankings**						
Services (Procurement) (Esain, Griffiths and Hines, 2001)	1	2	3	4	5	6	7
Manufacturing (Steel) (Esain, 2000)	1	2	3	4	5	6	7
Manufacturing(Job Shop Environments) (Rawabdeh, 2005)	6	5	7	3	4	1	2
Manufacturing (Automotive) (Taylor and Burnt. 2010)	5	1	6	4	3	7	2
Manufacturing (Bread Production) (Goriwondo, Mhlanga and Marecha, 2011)	5	4	6	7	2	3	1
Manufacturing (Miller, Wroblewski and Villafuert, 2013)	1	7	6	5	3	4	2
Manufacturing(Gaza Strip 1) (El-Namrouty and AbuShaaban, 2013)	3	3	3	6	7	2	1
Manufacturing (Gaza Strip 2) (El-Namrouty and AbuShaaban, 2013)	5	2	6	7	1	4	3

Table 2: Participant Demographics

Participant	Gender	Age	Length of Service
Manager (M1)	M	52	30
Manager (M2)	M	44	19
Manager (M3)	M	56	33
Manager (M4)	M	43	17
Manager (M5)	M	45	20
Manager (M6)	M	55	30
Manager (M7)	M	57	33
Manager (M8)	M	37	12
Manager (M9)	M	51	27
Manager (M10)	M	56	32
Employee (E1)	F	50	29
Employee (E2)	M	42	15
Employee (E3)	M	37	14
Employee (E4)	M	60	34
Employee (E5)	F	45	10
Employee (E6)	F	48	23
Employee (E7)	F	24	2
Employee (E8)	F	46	19
Employee (E9)	M	37	10
Employee (E10)	F	45	22

Table 3: Bank Demographics

Bank	Number of Personnel	Number of Branches	Revenue	Number of Study Participants
"Beta"	13,000	600+	2.3 billion Eur	3 Managers 2 Employees
"Gamma"	10,000	500+	0.5 billion Eur	2 Managers 3 Employees
Delta"	8,500	500+	2.6 billion Eur	2 Managers 2 Employees
"Epsilon"	8000	400+	0.5 billion Eur	3 Managers 3 Employees

Table 4: Round 1 Rankings

Waste	Round 1 Employees Rankings	Round 1 Managers Rankings	Round 1 Overall Rankings
Overproduction	5	1	3
Waiting	4	3	2
Defects	2	2	1
Motion	6	4	5
Transportation	7	7	7
Inventory	1	5	3
Over-processing	3	6	6

Table 5: Round 2 Rankings

Waste	Round 2 Employees Rankings	Round 2 Managers Rankings	Round 2 Overall Rankings
Overproduction	6	5	5
Waiting	3	3	3
Defects	2	1	2
Motion	7	7	7
Transportation	8	8	8
Inventory	5	4	4
Over-processing	4	6	5
Underutilized Resources	1	2	1



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