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Scaffolding a collaborative process through concept mapping: a case study on faculty development

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Abstract

Purpose – Concept maps have been described as a valuable tool for exploring curriculum knowledge. However, less attention has been given to the use of them to visualise contested and tacit knowledge, i.e. the values and perceptions of teachers that underpin their practice. This paper aims to explore the use of concept mapping to uncover academics’ views and help them articulate their perspectives within the framework provided by the concepts of pedagogic frailty and resilience in a collaborative environment.

Design/methodology/approach – Participants were a group of five colleagues within a Biochemical Science Department, working on the development of a new undergraduate curriculum. A qualitative single-case study was conducted to get some insights on how concept mapping might scaffold each step of the collaborative process. They answered the online questionnaire; their answers were “translated” into an initial expert-constructed concept map, which was offered as a starting point to articulate their views during a group session, resulting in a consensus map.

Findings – Engaging with the questionnaire was useful for providing the participants with an example of an “excellent” map, sensitising them to the core concepts and the possible links between them, without imposing a high level of cognitive load. This fostered dialogue of complex ideas, introducing the potential benefits of consensus maps in team-based projects.

Originality/value – An online questionnaire may facilitate the application of the pedagogic frailty model for academic development by scaling up the mapping process. The map-mediated facilitation of dialogue

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within teams of academics may facilitate faculty development by making explicit the underpinning values held by team members.

**Keywords** Collaboration, Concept mapping, Curriculum development, Faculty development, Questionnaire

**Paper type** Case study

**Introduction**

Concept mapping (Novak, 2010) has been used in numerous educational settings and is becoming a common feature in the higher education literature (Kinchin, 2014). Most of the studies that have been published to date have tended to concentrate on mapping curriculum knowledge (i.e. agreed knowledge). However, less attention has been given to the use of concept mapping to visualise contested knowledge which may have been regarded as tacit knowledge: the values and perceptions of teachers that underpins their practice (Lygo-Baker et al., 2008; McNaughton et al., 2016; van den Bogaart et al., 2017; McMillan and Gordon, 2017).

This study was undertaken with a group of five academic colleagues working within the same Biochemical Sciences Department who appeared to have a shared philosophy of teaching and were working on the development of a new undergraduate curriculum. The group was very positive about their teaching role, and their dialogue revealed explicit trust and respect for each other and were keen to develop their pedagogic scholarship (Rowland and Myatt, 2014). In a single-case study, we explore the use of concept mapping to not only uncover the academics’ views about their teaching practice but also help them articulate their perspectives within the framework provided by the concepts of pedagogic frailty and resilience in a collaborative environment (Kinchin, 2017; Kinchin and Winstone, 2017). We expected the discussion and development of concept maps to facilitate a greater level of pedagogic resilience in the face of a wider environment that is considered by the participants to be resistant to radical change within the teaching sphere.

**Background**

There are many approaches to collaboration and cooperation in the existing literature (O’Donnell and Dansereau, 1992; De Lisi and Goldbeck, 1999; Dillenbourg et al., 1995; Fischer and Mandl, 2003; Kobbe et al., 2007). One of them, proposed by Fischer et al. (2002), distinguishes four processes of collaborative knowledge construction: externalisation of knowledge, elicitation of knowledge, integration-oriented consensus building and conflict-oriented consensus building. Some studies indicated that a cooperative outcome was enhanced through the use of content-specific visualisation tools, such as concept maps (Roth and Roychoudhury, 1993; van Boxtel et al., 1997; Correia et al., 2014). Furthermore, concept maps has also been described as a valuable tool for collaborative academic faculty development (Kinchin et al., 2016; Kinchin et al., 2017).

Developed by Novak and colleagues in the 1970s (Novak, 2010), concept maps are graphical organisers useful for making explicit the relationship between concepts through propositions – that is, the relationships between pairs of concepts by a linking line and phrase (see an example in Figure 4). Concept mapping has been used to visualise and represent knowledge (Hay et al., 2008); foster deep or meaningful learning (Blunt and Karpicke, 2014); as an assessment tool (Ritchhart et al., 2009) and collaboration tool (Torres and Marriott, 2010). In this paper, we explored concept mapping to scaffold each step of the collaboration process.
We step into the collaborative construction of knowledge is to include individual prior knowledge into the situation, i.e. externalise knowledge structures. According to Brown et al. (1989, p. 33), the exchange of different individual concepts is a good starting point for the negotiation of common meaning in discourse.

Concept maps can be used as an externalisation tool by offering a task that invites the individuals to provide evidence bearing on his or her knowledge structure in a domain (Shavelson et al., 2005; Kinchin, 2016). However, untrained users are more susceptible to cognitive overload during the map elaboration task (Aguiar and Correia, 2017). According to Cognitive Load Theory (Sweller et al., 2011) a task can be a source of two cognitive loads: the intrinsic load (i.e. load imposed to the learners’ working memory, which is related to the content complexity) and the extraneous load (i.e. the unproductive load imposed to a learner’s working memory, which does not contribute to learning). If both loads exceed the limits of working memory capacity, no resources are left to foster generative processes, namely, schema construction and manipulation or learning (van Merriënboer and Ayres, 2005; van Mierlo et al., 2012). The consequence would be a low-quality concept map, poor in structure and content, which does not represent the mapper’s mental structure of knowledge.

Some research regarding this issue can be found in the literature. For example, Stull and Mayer (2007) showed that constructing graphic organisers with little training imposes a higher extraneous load, impairing learning. Hilbert and Renkl (2008) carried out a study to characterise good and poor concept mappers after developing an effective training. According to them, unsuccessful mappers rarely labelled the links that connect the concept nodes. On the other hand, effective mappers invested great effort into planning their mapping process to produce a coherent concept map. Conradty and Bogner (2010) studied the implementation of concept mapping for novices, showing that most errors found in mappers’ propositions were content dependent, explaining this low-quality concept map feature due to a high intrinsic load.

To cope with these difficulties, we need to manage the intrinsic load and decrease the extraneous load as much as possible (Mayer and Moreno, 2009). In this paper, content complexity was reduced through an online questionnaire that split the content into parts of information. The extraneous load was decreased by providing a concept map produced by an expert on the technique, considering the criteria for an excellent content accuracy and graphical structure (Cañas et al., 2015; Correia and Aguiar, 2014).

The second step of collaborative knowledge construction is the elicitation process. This requires the participants to make statements or directives, request or provide explanations, give suggestions, agree or disagree with partners or groups to express or clarify knowledge during the task (Teasley, 1997). It is worth mentioning that concept mapping has been used successfully in the elicitation of implicit and tacit knowledge (Hoffman and Lintern, 2006).

The last step of collaborative construction of knowledge is the consensus building. To achieve a common solution for a given task, the participants in a group need to negotiate concepts and meanings (Weinberger et al., 2007). This consensus building is essential to achieve a high quality of cooperative outcome and can occur in different ways. The conflict-oriented consensus building occurs when the participants make use of different interpretations (i.e. cognitive conflicts) to stimulate their understanding of the topic (Deutsch, 2003). On the other hand, integration-oriented consensus building occurs when the
participants combine the variety of individual perspectives (i.e. integration) into a common interpretation (Hatano and Inagaki, 1991).

**Methodology**

We adopted a qualitative research approach by a case study as strategy of inquiry in this research. According to Creswell (2013):

> [...] a qualitative study is defined as an inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting.

In this paradigm, it is sought to establish the meaning of a phenomenon from the views of participants, which means identifying a culture-sharing group and studying how it develops shared patterns of behaviour.

In this paper, the participants were a group of five academic colleagues working within the same Biochemical Sciences Department working on the development of a new undergraduate curriculum. The group shares of some teaching views; however, most of their perspectives are implicit and idiosyncratic. To better understand how concept mapping could be useful for scaffolding collaboration process, in this context, a research procedure as outlined in Figure 1 was conducted.

First, the participants were asked to answer the online questionnaire about the research-teaching nexus[1] with no constraints of time. They took an average of 19.3 min (standard deviation of 8.4 min) to accomplish the task. Considering their answers to the questionnaire, the researcher (a map-expert) took approximately 20 min to produce individuals’ concept map using Microsoft PowerPoint®. These maps were printed on a A4 sheet and presented to the participants at the beginning of the group session.

The group session started with the research purposes and objectives. The participants analysed and discussed the separate concept maps and then developed a paper and pencil collaborative/consensus concept map. They had approximately 1 h to accomplish this task. Finally, the digital map (drawn using Microsoft PowerPoint®) was sent to the participants by e-mail with an evaluation form that invited them to provide feedback about the process, which will help us to improve the online questionnaire design for a future application.

**Online questionnaire design and individual concept map**

The questionnaire was designed in six parts (A-F). Each part had the purpose of identifying participants’ conceptions and beliefs about one specific aspect of the of research-teaching nexus. The purpose, question type and answer format are provided in Table I. The Qualtrics survey platform was used to host the questionnaire, which it was controlled by password[2].

The participants’ answers were downloaded and analysed to consider their content. Each part of the questionnaire provided information that was “translated” into concepts and propositions needed to draw the individual concept maps. To illustrated this protocol, we show a partial view of one participant’s answers to the questionnaire Parts B (Figure 2) and C and D (Figure 3) and their correspondence to the concept map (Figure 4).

Good concept maps must fulfil some predefined criteria related to both graphical structure and content accuracy, such as organising concepts in a hierarchical way and constructing correct and relevant propositions (Cañas and Novak, 2006). In this paper, we followed these criteria to ensure construction of an “excellent” concept map, which is not only concise but also captures the complexity of the involved content (Cañas et al., 2015; Correia and Aguiar, 2014).
Figure 1. An outline of the research procedure
<table>
<thead>
<tr>
<th>Part</th>
<th>Purpose</th>
<th>Question type</th>
<th>Answer format</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Level of importance and priority considering teaching and researching activities</td>
<td>14 scrambled research and teaching activities</td>
<td>Rank order</td>
<td>(a) Disciplinary research activities: manage approved grants and scholarships; engage on peer review paper or proposal. (b) Teaching activities: lecture; grade students' assignments; prepare a lesson plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rank in order of importance and priority when no constraints of time is imposed</td>
<td>(c) I usually encourage research in my classes</td>
</tr>
<tr>
<td>B</td>
<td>Level of agreement considering some general beliefs about research and teaching on higher education</td>
<td>30 statements to be judged</td>
<td>Multiple matrix</td>
<td>(a) For me, research generates [more</td>
</tr>
<tr>
<td>C</td>
<td>Personal beliefs when comparing research and teaching rewards, recognition, motivation and status</td>
<td>6 questions that compare research and teaching</td>
<td>Multiple choices</td>
<td>(d) I usually encourage research in my classes</td>
</tr>
<tr>
<td>D</td>
<td>Examples of rewards, recognition and status on research and teaching</td>
<td>6 questions that ask for examples</td>
<td>Short text entry</td>
<td>Considering only the research activities, how influential is each of the below options in relation to rewards, recognition and status?</td>
</tr>
<tr>
<td>E</td>
<td>Perception of how influential are some 'actors' for rewards, status and recognition within research and teaching</td>
<td>2 questions requesting the influence of university, colleagues, the academic community, students, head of department and society</td>
<td>Slide bars</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>General behaviour to a given scenario considering a tight deadline</td>
<td>2 questions that put some tension between research and teaching</td>
<td>Long text entry</td>
<td>Imagine that you have a tight deadline to finish the following tasks: review your own paper that it is approved to be published; come up with an idea for a PhD grant proposal; plan the next lecture by selecting materials and the best learning approach; come up with an idea for an assessment task to evaluate your students</td>
</tr>
</tbody>
</table>

Table I. Questionnaire design Note: Each part of the questionnaire (A-F) had a purpose, a question type and an answer format. Some examples are provided.
To start drawing the concept map, we chose some key concepts to represent the research-teaching nexus (Kinchin *et al.*, 2016): university, academia, students, research, teaching, rewards, recognition, status and motivation. We organised these concepts in a top-down hierarchy. For example, academia encompasses the completely academic community, including universities, at the top of the map. The examples regarding rewards and recognition should be on the bottom of the map as they are very specific and individualised.

As soon as the key concepts were hierarchically organised, we connected pairs of concepts through a directional arrow (to offer a reading flow) and a linking phrase with a proper verb. In other words, we established concise and clear propositions by using the statements judged as “strongly agree” or “strongly disagree” in Part B of the questionnaire (Figure 2). For example, the showcased individual academic strongly agreed that the academia overvalues research (1a, Figure 2) and undervalues teaching (1b, Figure 2). Both statements were transformed into propositions 1a and 1b in Figure 4. He also strongly disagreed that university has a systematic way to evaluate a good researcher (3a, Figure 2) and a good teacher (3b, Figure 2). In this case, the linking phrase received a negative connotation (“does not have”) and it was shared to construct both propositions (see 3a and
The same pattern can be seen for Statement 6 in the questionnaire; as he strongly disagreed that teaching leads to high status and rewards at the same time, the proposition was constructed with the negative “does not lead” and shared as a linking phrase for both propositions (see 6 in Figure 4).

Statement 2 in the questionnaire required adding “knowledge” as a new concept in the map, and Statement 4 required a double-headed arrow to represent a two-way relationship between “research” and “teaching” (see 2 and 4 in Figure 4). It is important to note that slight agreements or disagreements were disregarded when constructed the concept map, first, because we aimed to produce a consensus map with the academics’ strongest views highlighting the difference between them and, second, because the use of “might”, “can be”, “perhaps”, “sometimes” decreases the level of content accuracy and the map’s explanatory feature. Finally, adding too many propositions would hamper the map’s visual layout and readability (Derbentseva and Kwantes, 2014), which might be a source of disorientation and extraneous load (Amadieu et al., 2009), which reduce interpretation by the participants.

Statement number 5, for example, can be confirmed using two sources of information in the questionnaire. The academic strongly agreed that research leads to recognition (Part B, 3b in Figure 4). The same pattern can be seen for Statement 6 in the questionnaire; as he strongly disagreed that teaching leads to high status and rewards at the same time, the proposition was constructed with the negative “does not lead” and shared as a linking phrase for both propositions (see 6 in Figure 4).

**PART C**

Please, choose the word in the list corresponding to the most appropriate answer to each question that best fits your personal beliefs.

*For me, research generates (__________) recognition than teaching*

- more 5
- less
- equal

*For me, research generates (__________) motivation than teaching*

- more
- equal
- less 7a

**PART D**

Please, write one or two words inside each box corresponding to the most appropriate answer to the question. Do not spend too much time on the task, if you cannot remember anything, just leave it blank.

*If you are a good researcher, the two most important rewards are:*

- promotion 10

*In research, what does recognition look like?*

- papers; grants; promotion 8a

*In teaching, what does recognition look like?*

- more teaching 8b

*In research, the status can be a consequence of mainly two things:*

- papers; grants 9

**Note:** The short answers (7a-10) were used to elaborate his individual concept map shown in Figure 4
Figure 2) which is higher than in teaching (Part C, Figure 3). The same pattern can be seen for Statement 7a in the questionnaire. In Part B, he strongly agreed that teaching leads to motivation and in Part C he said that motivation is higher for teaching than research. Both answers produced the proposition 7a in the concept map (Figure 4). As he strongly agrees that motivation is needed for research, we created a new proposition 7b in the map (Figure 4).

Part D of the questionnaire (Figure 3) provided some examples to progressively detail how the academic understood the rewards, recognition and status within higher education. For example, in research, recognition looks like a grant, papers and promotion, but in teaching, it means more teaching (8a and 8b in Figure 4). For him, one of the main consequence of high status in research is the papers and grants, but not promotion. Then, we decide to separate two concepts “paper and grants” and “promotion” so we can use the first one to establish the proposition number 9 in the map (Figure 4). Finally, as one of the institutional rewards is promotion, we used this concept to create the proposition number 10 in the concept map (Figure 4).

Parts A, E and F of the questionnaire helped us to understand how the academics connect research and teaching and to identify any inconsistencies on their discourses. For instance, if in Part A, he/she affirmed that his/her teaching practice is informed by research, but in Part F, it is written that he/she cannot connect research and teaching in his/her academic life, we can identify an inconsistency that needs to be clarified. In this case, we can create a proposition with a question mark (e.g. Teaching – is informed by (?) Research) and ask him/her to clarify and explain these propositions during the group session.

Collaborative activity and evaluation
Two researchers monitored the group discussion. At the beginning of the session, the researchers initiated some discussion about the research-teaching nexus and invited the
group to review their individual maps and then (as a group) produce a consensus map that represents their view as a team. It is important to note that even though the academics were briefly introduced to the concept mapping technique, it was the first time they had produced one as a group. They were instructed to use any and as many concepts that they might consider important to express their views. They drew the map on a blank A3 sheet of paper using yellow self-stick notes and they took approximately 60 min to accomplish the task.

The digital concept map was sent to the academics by e-mail followed by some questions that invited them to evaluate the previous activities. Using a five-point Likert scale, this evaluation form aimed to measure:

- Mental demand: from 1 (very low) to 5 (very high).
- Clarity of the questions: from 1 (very unclear) to 5 (very clear).
- Level of interest: from 1 (boring) to 5 (interesting).
- Level of challenge: from 1 (no challenging) to 5 (very challenging).
- Concept map accuracy: from 1 (inaccurate) to 5 (accurate).
- Concept map helpfulness as a visualisation tool: from 1 (unhelpful) to 5 (very helpful).

It also asked the participants to provide some benefits and limitations of the research-teaching nexus questionnaire and the concept mapping technique. The academics’ answers were analysed and offered some insights to improve the proposed activities.

**Results and discussion**

The collaborative concept map produced during the group session can be seen in Figure 5. The participants started the discussion by asking themselves “where” exactly the tensions between teaching and research occur. Using their individual maps (Figure 4), they realised

![Figure 5. A collaborative concept map of the group’s perspective of the research-teaching nexus](image-url)
that “academia” and “university” are wider social institutions with heterogeneous values, which might not reflect the particularities of the Department of Biochemical Sciences. For them, the discussion needs to be undertaken at the departmental level, leading them to choose the concept of “department” to start the concept map.

Another point of discussion occurred with the concept of “research” in the individual maps (Figure 4). They split this concept into two types of research: disciplinary, subject-specific research (Biochemistry) and pedagogic research (Scholarship of Teaching and Learning). Tension arises because the Department of Biochemical Sciences explicitly recognises the subject-specific research but does not yet recognise pedagogic research. Teaching is the concept that connects both types of research and they chose to put it between disciplinary and pedagogic research (Figure 5).

The concepts at the bottom of the map were negotiated considering the asymmetric status, rewards, recognition and motivation that come from teaching and research activities (see an example in Figure 4). The participants all agreed that there is a huge perceived asymmetry for these activities. Whilst disciplinary research provides a “clear route[4]” for promotion and, consequently, high status, rewards and recognition, pedagogic research leads to staff and student satisfaction, though this is poorly defined in terms of recognition and promotion within the department. As we can see in Figure 5, there is no direct connection between both sides of the map, providing a good insight into research and teaching nexus. It is important to note that the collaborative map summarises the main ideas discussed during the group session. The participants’ individual knowledge structures (highlighted by the questionnaire and the individual concept map) were modified over the collaborative process leading to a product that is not the sum of their knowledge but a transformed and new structure (Lee et al., 2015).

Figure 6 shows a graph that summarises the participants’ evaluation of the questionnaire and the individual concept maps.

![Figure 6. Participants' feedback about the questionnaire and the concept map](image)

**Note:** The average score is illustrated in each evaluation scale.
As we can see in Figure 6, answering the questionnaire did not require a very high mental activity from the participants (mean = 3.4), indicating that the cognitive load imposed by this activity does not lead to an overload situation (Sweller et al., 2011). However, some improvements need to be made to the questions to increase their level of clarity (mean = 3.2). Some participants pointed out the lack of clarity as a questionnaire limitation, for example:

- Research could be clearer in the questionnaire as a pedagogic- vs discipline-specific.
- Some of the questions were a little ambiguous, so could be interpreted in different ways. However, this gives space for participant interpretation.
- It was hard to understand through the survey what the question poser in some questions, which meant that we essentially answered different questions, which probably changed our maps slightly.

The participants also declared that the questionnaire offered a challenge (mean = 3.9) to them without being boring (mean = 4.3). The feedback regarding the level of helpfulness (mean = 4.7) and accuracy (mean = 4.2) was important in the re-design the questionnaire. For them, not only was the individual concept map an accurate representation of their point of view, but it was also very helpful to visualise their perspective about the relationship between research and teaching within the Department of Biochemical Sciences:

- Consciously consider of how these things fit together and perhaps plan how to try to move the balance in the future.
- See other team members’ perspectives on it, these are people you work with daily, and sometimes it can explain their approach to certain scenarios.
- It was a good process to go through to highlight common areas with other team members and how sometimes we approach things in different ways.
- Overall, the concept maps seemed accurate and were hugely helpful for producing a team map.
- Interesting exercise. It clarifies the focal points, personally and for the team.

Final considerations
Engagement with the questionnaire has the benefit of:

- Providing the participants with an example of an excellent concept map produced from the questionnaire results. Very often, subject-expert/novice mappers tend to concentrate on adding material (making the map bigger) rather than reflecting on the content and refining the quality of the links. The process defined in this manuscript, therefore, helps in the construction of succinct maps with a high degree of explanatory power.
- Sensitising the participants to the concepts involved and the possible links between them. Rather than going into the group discussion “cold”, the construction of a map through the questionnaire helps to make explicit the areas that are appropriate for discussion (i.e. boundaries for the map) concepts that might populate the structure.
• Facilitating the sharing of perspectives within a group by allowing peers to see how the ideas are linked in each other’s minds. This offers a more detailed window into their thinking than would be provided, for example, by a list of key ideas.

• Introducing novice participants to the potential benefits of consensus maps in team-based projects that could be translated into the direct teaching environment.

Notes
1. The research-teaching nexus is concerned with how research and teaching are connected in academics’ lives. It refers to the perceptions on whether research is seen as a product or as a process and the relative importance of these activities to their professional identities.

2. To have access to the survey please use the password ‘unlock’ and the following link: https://goo.gl/wK4qCa (18 October).

3. The evaluation form can be accessed using the link: https://goo.gl/wYDjrb (18 October).

4. For them, a ‘clear route’ towards promotion means that they are aware of the department expectations regarding disciplinary research – it is clear what they need to do in order to gain promotion (e.g. publish papers in mainstream journals and get research grants).

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Abstract

Purpose – This paper aims to examine the legal challenges to electronic banking and initiatives taken to address them in Tanzania. It is based on the results of a comparative analysis of policies and laws of other countries from which Tanzania can pick a leaf on how to deal with challenges brought by information and communication technology-induced innovations in the banking sector.

Design/methodology/approach – The study upon which this paper is based employed comparative analysis methods by analysing different policies and laws of Tanzania in line with attendant laws of other jurisdictions such as the USA, Malaysia, South Africa, Rwanda and Kenya and international instruments in a bid to establish the best practice pertaining to controlling and containing legal challenges brought by developments in electronic banking.

Findings – This paper confirms that, the prevailing laws guiding electronic banking in Tanzania do not adequately address the challenges the banks and customers face during electronic banking transactions. Thus, there is a need to amend the Tanzanian laws guiding this sector to put in place legislation capable of facilitating the development of electronic banking whilst addressing the associated challenges the users encounter.

Originality/value – This paper underscores the value of amending existing or enacting new laws in line with the development of technology/innovation to protect consumers in nascent electronic banking of the country. Moreover, it advocates for the development of innovation in banking sector should not be left to grow without amending/enacting laws that will promote its development and at the same time protect the users to avoid far-reaching and often unpleasant implications.

Keywords Law, Rule of law, Financial reform and regulation, E-banking legal challenges, Information and communication technology cybercrime

Paper type Research paper

1. Introduction

1.1 Emergence of electronic banking in Tanzania

The banking activities in Tanzania could be traced back to the 1900s Binamungu and Ngwilimi (2006). Modern banking practices were ushered in by the colonists who, for the purpose of facilitating their economies in Tanzania and East Africa at large, introduced banks. The earliest banks were a product of the German regime in Tanganyika. A great deal of banking regulations, however, emerged under the British regime from 1919 in Tanganyika when it took over the colonial mandate from Germany and Tanganyika became a British Protectorate. Apart from introducing more banks than ones left by the Germans, the British...
enacted a number of laws to regulate banking activities in Tanganyika. After independence, these banks carried on the colonial banking legacies till the 1967 Arusha Declaration led to the nationalisation of all the private banks Binamungu and Ngwilimi (2006).

In the early 1990s, a report on the Inquiry into Monetary and Banking Systems in Tanzania[1] paved the way to the enactment of the Banking and Financial Institution Act, 1991. Despite its remarkable contribution, the Act did not point out anything on electronic banking because the information and communication technology (ICT)[2] had not been embraced by most of the financial institutions in the country at that time though its impacts had already been felt by developed countries such as the USA and the UK[3].

In Tanzania, electronic banking (or e-banking) has remained largely in its infancy despite an overwhelming response in its applicability and reception. Apart from the banks, other financial institutions have also adopted new methods of electronic financial transactions. The adoption of the Automated Teller Machines (ATMs) by various banks and financial institutions and mobile banking by various communication companies such as Tigo, Vodacom and Airtel have encouraged the adoption of habits for deposits and quick transfers of money or payments via electronic payment services. The adoption of electronic banking by CRDB[4], NMB[5], DCB[6], Exim Bank and NBC[7], for example, confirms the development of electronic banking in the country.

According to the Bank of Tanzania (BoT) – the country’s central bank – report (2016), to some extent, there are significant developments in country’s electronic banking. The report shows that many banks use electronic banking delivery channels. These channels include ATMs, internet banking and electronic fund transfer at point-of-sale and mobile banking. However, the cyber environment comprising people, technology and applications creates a sophisticated environment for cyber threats to thrive in electronic banking. The environment consists of a learning information society (internal and external) with knowledge, skills and technologies and opportunities for cyber threats in electronic banking in Tanzania (Ally, 2016). As such, Tanzania cannot ignore this situation as it needs to act fast by taking necessary and sustainable steps to address and contain the situation before it got out of hand. This study assessed the existing policy, legal and institutional framework of ICT in electronic banking to establish whether they are sufficient and effective enough to prevent and contain cybercrime in Tanzania.

2. Challenges to the application of e-banking in Tanzania
Like other countries, the emerging ICT technology is fostering electronic banking in the country in terms of electronic banking delivery channels such as ATMs, internet banking and electronic fund transfer at point of sale. Electronic banking delivery channels have made the transfer of money more efficient and effective than traditional un-automated banking as customers can now conveniently access their respective accounts at any place and at any time without standing in long files. Clients can access different services without visiting bank premises and thus be subjected to long queues as in the pre-automation banking era. On the other hand, these innovations in banking have exposed one important challenge regarding how the existing policies, legal and institutional frameworks can address the emerging challenges of electronic banking largely unseen in the established pieces of legislation.

In its report, the BoT (2011) acknowledges that the existing policies and laws guiding the banking sector are outdated and, hence, largely ineffective in dealing with the emerging problems as a result of ICT development. These problems include rising cases of cybercrimes in e-banking such as fraud and unauthorised transactions and lack of physical infrastructure to support development such as unreliable power supply and
telecommunication. Indeed, these problems can be solved by having in place a comprehensive policy and law coupled with a good institutional framework for their implementation. According to the Law Reform Commission of Tanzania (2005), the country has no comprehensive policy and law regulating e-banking. The existing policies and laws leave some lacunas in aspects of e-banking because they do not adequately cover computer misuse, e-banking channels such as internet banking and mobile banking.

In fact, the current policies and laws are silent on the allocation of loss in case of e-banking fraud. The Tanzania National Electronic Banking Guidelines of 2007, for example, lack legal enforceability. Even the recently enacted laws, the Cybercrimes Act, 2015[8], and the Electronic Transaction Act, 2015[9] do not address in detail issues of e-banking. Similarly, the National Payment System, 2015[10] has failed to address many pertinent issues, such as e-cheque and customer protection. In general, the prevailing policies, legislation and institutional framework of ICT in e-banking do not protect adequately the banks and customers involved in these e-banking transactions and services.

3. Policy, legal and institutional framework initiatives

3.1 Policy initiatives

3.1.1 National Information Communication Technology Policy, 2016. This policy came into force in 2016 with the main objective of accelerating socio-economic development with the potential of transforming Tanzania into an ICT-driven middle-income economy and society. The policy acknowledges that there is a pressing need for a comprehensive, technologically neutral and dynamic policy, legal and regulatory framework to address issues of privacy, ICT legislation and cybercrimes[11].

3.1.2 Tanzania national payment System-Vision and strategies, 2005. In 2005, Tanzania enacted Tanzania National Payment System Vision and Strategies. One of the main aims of this policy is to establish legal and regulatory framework to guide the payment system in Tanzania. Since 2005, no sufficient efforts have been made to achieve this goal. In fact, it has taken ten years for the country to enact the Cybercrime Act, 2015[12], the National Payment System Act, 2015[13], and the Electronic Transaction Act, 2015[14]. And yet, some of the enacted legislations do not detail issues concerning e-banking. As a result, many of electronic banks challenges remain largely unaddressed by the existing laws.

3.1.3 Bank of Tanzania Electronic Payment Scheme Guidelines, 2007. Before the BoT Electronic Payment Scheme Guidelines came into force there was no guide regarding the electronic payment system. For quite a long time, all the transactions were performed manually. Similarly, even policies did not guide these recent modes of electronic financial transactions. The revolution of ICT in the financial sector came up with the challenges of data protection, electronic financial crimes such as unauthorised transactions and data destruction.

3.1.4 Outsourcing guidelines for banks and financial institutions, 2008. If a certain technology is necessary and is available in other areas, then it is possible to outsource such a service. Thus, the Outsourcing Guidelines for Banks and Financial Institutions, 2008 were developed to guide outsourcing in Tanzania’s banking industry.

Yet, apart from lacking a legal force, these Guidelines fail to cover salient issues such as the scope of activities to be outsourced and how. In fact, the liability of the third party is not clear and there are no stipulated penalties for non-compliance. These guidelines seem to have been made in a hurry without considering all possible scenarios pertaining to the banking business.
3.2 Legislative initiatives

The main laws governing the banking industry in Tanzania are the Bank of Tanzania Act, 2006[15] and the Banking and Financial Institutions Act, 2006[16]. Under the Bank of Tanzania (BoT) Act, 2006[17], the Minister responsible can make necessary or desirable regulations to facilitate the smooth running of the banking business[18]. The Bank and Financial Institution Act, 2006, among others things, has been enacted to provide a supervision mechanism for banks and financial institutions. The Act also empowers the Minister to make necessary or desirable regulation[19].

Other laws which can be used to regulate the banking sector depending on prevailing circumstances include the Foreign Exchange Act[20] which deals with *inter alia* foreign currencies, the Law of Contract Act[21] which regulates contracts, the Land Act[22] when it comes to mortgage, the Company Act[23] for bank registration and Electronic and Postal Communication Act, 2010[24], for electronic communication. However, most of these legislations were enacted basically to regulate paper-based transactions and not those occurring in the online environment. Even when these Acts were enacted during electronic era, they do not go into detail necessary to address issues of electronic banking. A good example is the Electronic and Postal Communication Act, 2010[25].

The following part discusses three legislations, namely the Cybercrimes Act, 2015[26], the Electronic Transactions Act, 2015[27] and the National Payment System, Act, 2015[28]. Moreover, it discusses in detail the provisions of these legislations in relation to e-banking in line with the objectives of the present article.

3.2.1 The Cybercrimes Act, 2015. In 2015, Tanzania enacted the Cybercrimes Act, 2015, which prescribes cybercrimes and their attendant punishments. These crimes include those committed via the computer system and information technology such as illegal access, illegal remaining, illegal interception, illegal data interference, data espionage, illegal system interference, illegal devices, computer-related forgery, computer-related fraud, identity related crime and conspiracy to commit offence[29].

The Act also provides procedures for search and seizure[30], liability of service providers[31] and general provisions regarding immunity, forfeiture of property, and offences by a body corporate, compounding of offences and spells out the power of the minister to make Regulations[32].

3.2.2 The Electronic Transaction Act, 2015. The Act recognises electronic transactions and their effects[33]. It also recognises electronic contract[34] and the admissibility of electronic evidence[35]. In fact, this Act also regulates electronic transaction in general.

3.2.3 The National Payment System Act, 2015. As its title implies, the Act aims to regulate and supervise the payment systems, regulate electronic payment instrument, e-money, payment system service providers, validity and enforceability of netting arrangements, finality and the settlement of payment instruction and other related matters.

4. Basic omissions in policies, laws and institutional framework guiding e-banking in Tanzania

Apart from the weaknesses in the current policies, laws and the institutional framework of ICT guiding electronic banking in Tanzania that have been pointed out thus far, there are basic omissions which ought to be addressed to develop even further e-banking while safeguarding the interests of the banks or financial institutions and customers by creating a conducive and safe online banking environment in the country. These following are some of the omissions that need to be addressed discussed below:

To begin with, the BoT Guidelines (2007) do not address at all the issue of liability in the event of risk/loss. For Tanzania, the situation is aggravated because banks are allowed to
unilaterally dictate terms and conditions without consulting their customers and, finally, Bank approval. Consequently, the banks make terms and conditions which absolve them from all liabilities, for example, the terms and conditions of CRDB[36]. In addition, some banks can unilaterally change terms and conditions without informing their customers, for example, terms and conditions of DCB mobile[37] and CRDB[38]. These terms and conditions of banks are unilateral as banks create them with the sole intention of protecting their interest while interests at the expense of those of the customer.

Thus, these banks should be guided in this regard to create fair and impartial terms for both the banks or financial institutions and their customers. In this regard, there is a need to formulate comprehensive policy to guide all the banks and financial institutions countrywide.

Unlike Tanzania, Mauritius Guidelines on Internet Banking, 2001 provides precisely inter alia that the contractual arrangements for liability should cover the sharing of risks between the institution and customers[39]. The rationale behind this provision is that customers should not be liable for loss not attributable to or occasioned by them. Including a similar provision in Tanzanian law can add value to the Tanzania BoT Guidelines of 2007.

In similar vein, Malaysia provides a good lesson. In this context, Malaysia’s Guidelines on Consumer Protection on Electronic Fund Transfer, 1998 (BNM/GP 11) require the bank or financial institution to enter into contracts with their customers which provide for the sharing of risks. As such, the customers should not be made liable for any loss to which they have not contributed and the same applies to banks or financial institution. Implicitly both parties are protected against the loss caused by the other party.

Second, the BoT Electronic Banking Guidelines of 2007 do not provide damage recovery in e-banking transactions. As result, banks and financial institutions can decide unilaterally on how to pay damages without being guided. Some banks such as the NMB through its terms and conditions state that the bank shall not pay any damage to customers in connection with their account or service[40]. In other countries, guidelines address this issue to avoid such pronouncements that disadvantage customers without due regard.

Whereas the BoT Electronic Banking Guidelines of 2007 do not provide damage recovery in e-banking transactions, the United Nations Commission of International Trade Law (UNCITRAL) Model Law has comprehensively addressed the issue of damages recovery liability both directly and consequentially[41].

During interviews with NBC[42], CRDB, ÉCO BANK, NMB and Postal Bank customers, many of them complained about the damage recovery in e-banking as a result of the loss incurred by them due unauthorised transactions for which are caused by the banks. Some banks, normally, refund the customers the exact amounts after negotiations upon getting complaints. However, they do not consider compensating the customers for the time and other imbalances occasioned by such e-banking damages. In such cases, the UNCITRAL Model Law can serve as a sample guide in drafting guidelines aimed to address this gap in the Guidelines currently in force in the country’s banking sector.

Third, the Acts do not provide the right to countermand as the law is silent on this matter and banks are normally left to decide without any due guidance. This means a customer cannot demand such rights under the Tanzanian law. As the BoT Guidelines (2007) do not provide for this right, the banks deny customers this right by imposing terms and conditions that favour respective financial institutions to the detriment of customer interests and rights. A good example to illustrate this point is the CRDB General Terms and Conditions, which denies customers such a right[43].

Whereas in Tanzania the law does not give the right of countermand, in the US the Electronic Fund Transfer Act, 1978 provides for and guarantees this right[44]. The Act states:
“(a)[…]A consumer may stop payment of a pre-authorised electronic fund transaction by notifying the financial institution orally or in writing at any time up to 3 business days before the scheduled date of the electronic fund transaction[…].”

The US Electronic Fund Transfer Act, 1978 defines the term “pre-authorised electronic fund transfer” as an electronic fund transfer transaction authorised in advance to recur at substantially regular intervals[45]. Thus a consumer who arranges with his/her bank a pre-authorised a credit transfer has the right under Electronic Fund Transfer Act (EFTA)[46] to instruct his bank to stop such credit transfer. A bank that fails to act on a consumer’s stop payment order is liable for all damages proximately caused by such failure if such a failure was not a result of a bona fide error[47]. This includes intentional bank’s failure to act upon such stop payment orders. In effect, the bank is still liable for actual damage notwithstanding the maintenance of procedures reasonably adapted to avoid such bona fide failure to stop the payment order[48].

However, the US Electronic Fund Transfer Act, 1978 provides that where a bank completely fails to make a credit transfer, or fails to make a timeout transfer, it is relieved from that liability if such failure was caused by an act of God or other circumstances beyond its control, or by a technical malfunction which was known to the customer at the time he/she attempted to initiate an electronic fund transfer[49].

Clearly, banks are not only liable for their failure to stop a pre-authorized credit transfer, but are also obliged to disclose to their customers in readily understandable language[50]. Their failure to do so exposes them to civil liability, under which a bank is liable to actual damages sustained, statutory damages, and the costs of the successful action together with a reasonable attorney’s fee as determined by the court[51].

In the USA, the rules of stop payment in consumer-based transactions as discussed above are not only limited to pre-authorised credit transfer transactions but also extend to pre-authorised debit transfer transactions such as any debit transfer. In such cases, it is the payee who initiates the demand to transfer funds from his debtor’s (the payer’s) account to his account.

In Rwanda, for example, Regulation No.07/2010 of the National Bank of Rwanda on Electronic Fund Transfers and Electronic Money Transactions provides for that right that state as follows:

*The standard terms and conditions to carry out an electronic fund transfer shall include:*

- the customer’s right to stop payment of a preauthorized electronic fund transfer and the conditions and procedures to initiate such stop payment order[52].

In Bangladesh, the Regulations on Electronic Fund Transfer, 2014, confer this right[53], and it bears almost similar language as the provision in the Rwanda law that states as follows:

*2) the standard terms and conditions to carry out an electronic fund transfer shall include:*

- the customer’s right to stop payment of a preauthorized electronic fund transfer and the conditions and procedures to initiate such stop payment instruction.

On the whole, Tanzania can learn from the USA, Rwanda and Bangladesh in this area of law. It is unsafe to leave this matter simply in the hands of the banks without any form of codification. Such codification in law would enable the customer to demand for the right of countermand. As presently, there is no enabling provision, this noble right has been left up for negotiation between the bank and customers in Tanzania, and oftentimes the financial institutions take the liberty of coming up with unilateral terms and conditions to cover such voids. This happens because in most cases the customers are in a weak bargaining position during such negotiations. Thus, it is important for Tanzania to protect the weaker party by instituting robust codification of this right.

Fourth, the study found that liability in the event of erroneous e-banking transaction is common in Tanzania. Like other challenges, the policy and Act do not address this situation.
Issues such as error resolution procedure, bank’s liability and customer’s liability, acts constituting errors, the investigation of the alleged error, implementation of the investigation results and liability for non-compliance with error resolution procedure do lack satisfactory guidance under the present Acts.

Whereas liability in the event of erroneous and malfunctions in e-banking transaction in Tanzania is not addressed, in the USA, they have been duly addressed under[54]. The customer is required to report the error to the bank or financial institution as soon as he/she discovers the said error or mistake. When the bank or financial institution receives that notification, it has to determine whether there was error committed or not within ten working days. When it finds that there was error committed, it shall be obliged to inform the consumer about that error and correct the same in one business day including paying the interest where applicable. If the consumer has followed all the procedures, the banks may pay that consumer provisional re-credit pending further investigation into that error within ten working plus interest where applicable. However, the investigation shall not exceed forty-five days from the date when the bank receives a notification of error. If the bank finds no error was committed, it is obliged to inform the consumer accordingly within three business days. Nevertheless, if the court is satisfied that the bank or financial institution did not pay the consumer provisional re-crediting as required, let alone get satisfied that the investigation carried out by the bank was not in good faith, under such circumstances, the bank or financial institution shall pay the consumer treble damages.

To this end, the law is comprehensive as, indeed, it encourages each party to play its respective roles. The bank or financial institution settles the customers’ complaints in accordance with the set legal framework, which also stipulates the attendant penalties in case the bank ignores the provisions of the law. The law has set mandatory requirements for the bank or financial institution to operate in good faith. In fact, this is an essential general requirement that embodies all principles of equity and justice which in its present form is also covered. Under this provision, customers are sufficiently and effectively protected.

In comparison, there is significant difference between Tanzania and the US. The law in the US, has addressed this problem by spelling out all procedures under the law but in Tanzania, apart from being aware of this problem as there are many incidents of this nature occurring and recurring, no significant efforts have been made in this area by the authorities. Implicitly, all the rights of the customers are left to be administered by the banks whose commercial instincts are to safeguard their business interests first. Inevitably, the banking customer is at the mercy of the banks in the context of Tanzania.

Fifth, the laws are silent on the problem of double charge imposed by the electronic payment service provider, particularly in mobile payment through cellular phones, whereby sending and receiving money both attract charges. This situation contributes to the increase of costs of mobile money transactions. In Tanzania, there is no enabling provision to prevent double charge so as to enable the customer resort to court to seek their rights and redress. In this regard, Tanzania can learn from Australia Trade Practices (Amendment of Consumer Act) which precisely prohibits multiple pricing[55].

Sixth, the Acts do not protect minors in electronic payment. In practice, the country has evidenced the children making electronic transactions, with no efforts having been made to protect them. In Tanzania, the children are under-18 persons and the law treats them as minors, meaning any contract entered by them is null and void. Though this fact is known to many people in Tanzania and because of the nature of transaction which involves money, it is better for the law to require banks and financial institutions, especially the mobile money operators, to make an enquiry before effecting a transaction to ascertain the age of the customers. It is my considered opinion that there must be special statutory guidance to
In Tanzania, there is a need to protect minors in electronic transactions. In this regard, Tanzania can learn from the Organisation for Economic Co-operation and Development (OECD) on Consumer Policy Guidelines on Mobile and Online Payment, 2014. The Guidelines stipulate[56]:

To enable parents or guardians to monitor and limit children’s mobile and online payments for goods and services, businesses, governments and other stakeholders should:

- **Consistent with the guidance contained in section A, issue 1, on “Accessibility and readability of payment-related information”, work together to provide parents and guardians, prior to the children’s purchase of or access to goods or services that are likely to generate charges incurred by children, with clear, conspicuous and easily accessible information on the costs that may be incurred in acquiring, accessing or using goods and services, and information on how to avoid those costs.**

- **Develop effective mechanisms that enable parents or guardians to ensure that payments initiated by children are subject to their authorisation.**

- **Develop tools which enable parents or guardians to exercise different types of controls over the purchases they authorise their children to make; this would include, for example, tools to prevent children from making purchases without express parental consent or tools that enable parents or guardians to establish ceilings on the amounts that could be charged to an account during defined periods.**

- **Inform parents or guardians about the availability of such tools in a clear and conspicuous manner.**

Seventh, the electronic banking laws particularly the Cybercrimes Act No. 14, 2015 do not have comparable provisions to meet international best practices and, hence, there are not only gaps in the domestic law but also international co-operation can be affected. As the nature of cybercrime in e-banking can be committed across different countries international co-operation is important and necessary to prevent such crime. Accordingly, a specific provision is necessary in this area.

Eight, as for dispute settlement, the serious regulatory concern has to do with the confusion regarding the respective mandates of the TCRA[57] and the BoT in handling disputes over mobile money services. Although the BoT has been vested with the power to regulate financial matters, the terms and conditions of the Mobile Network Operators (MNOs) in jurisdictional and dispute issues direct the matter to the TCRA. This anomaly has created a regulatory confusion between the two entities vested with diverse powers.

### 7. Conclusion

As observed, limited efforts have been made in Tanzania to overcome the challenges to e-banking including cybercrimes. One of the big problems that ought to be addressed sooner rather than later is avoidance of unnecessary delays in responding to cybercrimes in e-banking. After all, procrastination is the thief of time. Overall, the increasing application of new innovations not only in banking sector but also in other sectors, such applications should go *mutatis mutandis* with the enactment of relevant and pertinent policy and law without leaving loopholes unplugged to protect the users. In this endeavour, Tanzania, as outlined in this paper can learn from the robust and more client-friendly legal provisions in USA, for developed countries, and Rwanda and Bangladesh in the developing world context.

### Notes

2. Information Communication Technology (ICT).
10. Act No. 4 of 2015.
11. Para. 3.6.1 of the National Information Communication Technology Policy, 2016.
15. Act No.5 of 2006.
17. Act No.5 of 2006.
18. Section 70 of the BoT Act, 2006 (Act No.5 of 2006).
28. Act No.4 of 2015.
29. Sections 4,5,6,7, 8, 9, 10, 11, 12, 15 and 27 of the Cybercrimes Act, 2015.
33. Sections 4-12 of the Electronic Transaction Act, 2015.
36. Clause 17.
37. Article 3.0.
38. Clause 15.
40. NMB Terms and Condition, clause 26 (b) and (c).
42. National Bank of Commerce (NBC).
43. Clause 17 (i).
44. 15 USC.s.1693 (e) (1978).
45. 15 U.S.C (section 1693 (a) (10).
46. 15 U.S.C (section 1693e (a).
47. 15 U.S.C (section1693(b)(a)3).
48. 15 U.S.C (section1693 (h) (c).
49. 15 U.S.C. (section.1693 (h) (b) (2) (c).
50. 15 U.S.C (section,1693(c) (a).
52. Article 16 of Regulation No.07/2010 of the National Bank of Rwanda on Electronic Fund Transfers and Electronic Money Transactions.
53. Article 17 (2) (c) of the Bangladesh Regulations on Electronic Fund Transfer, 2014.
54. 15 U.S.C (section 1963(f).
57. Tanzania Communication Regulatory Authority (TCRA).

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The digitally preserved old-aged art, culture and artists
An exploration of Google Arts and Culture
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Abstract

Purpose – This paper aims to explore the Google Arts and Culture platform in terms of parameters used for categorizing the digital collections by it; the total number of items and their types; top contributing artists; top ten historical events and figures; and the top ten countries having maximum artworks.

Design/methodology/approach – An online method was used to collect the relevant data for achieving the objectives of the study. Data were harvested from the official website of Google Arts and Culture (https://artsandculture.google.com/) during the period of 15 May to 31 May 2018, and the same was tabulated in MS Excel for analysis and interpretation.

Findings – The findings revealed that Google Arts and Culture includes a total of 6,272 artists, 228 media and 121 art movements. Moreover, there are a total of 641 historical movements; 6,250 historical figures; 9,692 places; 3,226 museum views; 1,702 zoom views; 39,607 featured videos; and 5,528 featured stories; 122 items organized by color and 954 organized by time.

Originality/value – The present study is first of its kind that focuses on exploration of diverse arts and cultural heritages of different countries and by diverse artists made visible by Google Arts and Culture initiative. It will significantly reinforce the art and cultural heritage lovers to acquire the knowledge pertinent to various types of arts and cultures that prevailed in antiquity across the globe and also make aware the conservators about how to use digital technologies for efficient preservation and visibility of unique artworks, artists and the places whom they belong.

Keywords Digital libraries, Historical events, Pictures, Top ten artists, Top-ten countries

Paper type Research paper

Introduction

In the course of human evolution, certain changes have occurred in their lifestyle that includes advancement in their living standards and means of communication they adopted. The consistent progress in the communication has simplified the knowledge spreading of masses. In the present era, digital technologies have shaped the social setup, economic well-
being and living luxuries of people in all walks. The communication has also achieved its highest standard in the form of Information and Communication (ICT). The ICT consists of a huge number of wireless networks, satellite telecommunications and broadcasting networks and applications such as internet, multimedia tools, database management systems (DBMS). ICT comprises a variety of technological tools. Due to the intervention of ICT in each and every field, digitization has gained a wide momentum (Krubu and Osawaru, 2011).

Before the digital age or emergence of ICT, handwritten or typed letters were the only real way of communication. While it meant waiting for days and even weeks to hear a response, they were used to convey all sorts of information from the mundane to the life-changing. Here, we look at a handful of letters from artists, writers and historical figures to get a sense of who they were and what they were going through at the time. A large part of the vast amount of information produced in the world is born digital and comes in a wide variety of formats: text, database, audio, film and image. For cultural institutions traditionally entrusted with collecting and preserving cultural heritage, the question has become extremely pressing as to which of these materials should be preserved for future generations, and how to go about selecting and preserving them. This enormous trove of digital information produced today in practically all areas of human activity and designed to be accessed on computers may well be lost unless specific techniques and policies are developed to conserve it (Conway, 1994). Preserving valuable scientific information, research data, media output, digital art, to name but a few areas, poses new problems. If such material is to be accessed in its original form, technical equipment – original or compatible hardware and software – must be maintained alongside the digital files that make up the data concerned. In many cases, the multimedia components of websites, including internet links, represent additional difficulty in terms of copyright and geography, and sometimes making it difficult to determine which country a website belongs to.

Traditional preservation methods, such as the “legal deposit” used by national libraries to ensure that copies of all printed materials are kept, cannot be applied as such to digital material for a variety of reasons, notably because Web “publications” often draw on data stored on servers in different parts of the world. The sheer volume of data concerned also poses a problem. It is estimated that the internet features one billion pages whose average lifespan is extremely short, estimated at 44 days to two years. Considered as the most democratic publishing medium ever, some argue that the ever-growing internet deserves to be preserved as a whole, as its pages and discussion forums can be considered a priceless mirror of society (Vohra and Aarti, 2011). The preservation of valuable manuscripts and documents is the need of the hour. Several such attempts have been made; for instance, World Digital Library is a venture with such efforts. Google Art and Culture is also one of them, and it is fully concerned with the development and preservation of art and culture dating back to centuries. The present study rotates around it and provides a full introduction regarding it.

**Historical overview of Google Art and Culture**

The project was initially launched on 1 February 2011 by Google, in cooperation with 17 international museums, including the Tate Gallery, London; the Metropolitan Museum of Art, NY City; and the Uffizi, Florence. In 2002, a major extension to Art Project was announced, and an agreement of partnership was signed with 151 museums from 40 countries. At present, the platform features more than 32,000 artworks from 46 museums. It includes works from institutions like the Art Gallery of Ontario; the White House; the Australian Rock Art Gallery at Griffith University; the Museum of Islamic Art, Doha; and the Hong Kong Museum of Art. The main intention for launching this project was to provide a second-generation platform and to be a resource without boundaries. Later in the year
2013, Google Cultural Institute joined the venture. This initiative is fully supporting the venture (Google Art and Project, 2018).

**The glimpse of Google Arts and Culture**

It is an online platform where the general public can access the high-resolution images of artworks housed in the initiative’s partner museums. The main Components of Google Arts and Culture are as follows:

- **Virtual gallery tour**: This feature allows the virtual visit to the gallery of each partner museum by using the options Google Street View or clicking the floor plan of the gallery. This feature is helpful in exploring the site.

- **Artwork view**: This feature helps to zoom in on a particular artwork and helps to analyze it in a greater detail. While analyzing the image, the user may also get information pertaining to the physical characteristics of the image (which includes size, material and artist). However, some of the other options include viewing notes, history of the artwork and information of the artist. The Google includes external links for the ease of its users to explore additional information about a particular artwork.

- **Create an artwork collection**: A Google account login can help users to create a collection of their own so that users can compile many images from the partner museum and save and create a gallery of their own.

**Review of literature**

The sustainability of art and culture within the sustainable developmental agendas has become an increasing priority, depicted as a fourth pillar, equal to social, economic and environmental concerns (Loach et al., 2017). The preservation of art and culture through new multimedia technologies is one of the key ideas to retain the sustainability of art and culture across the world. New-media technologies can help to disseminate cultural heritage between people, making them uniformly available, irrespective of spatial locations. It is believed that virtual heritage propagated through new-media have strong potentiality to create cultural awareness among people about our absconding cultural heritage (Cameron and Kenderdine, 2007). Similarly, the meaningful application of new-media into virtual heritage conservation should retain the cultural presence to fulfill the pedagogic aim of conservation – knowledge dissemination and awareness generation (Pujol and Champion, 2012).

One of the great initiatives taken to preserve the traditional art and culture is “Google Art and Culture” project which is a:

Scrupulous documentation of museum exhibits, which includes many Indian art museums. The projects cater to larger target audiences enabling them a virtual walkthrough of these museums. Being available to all internet users the project deploys the benefit of new-media by adopting a tool to disseminate knowledge irrespective of spatial boundaries (Kolay, 2016).

The Google Art and Culture Project (GACP) launched in 2011 is still a young initiative. As a result, there has been meager scholarly work published on the project. Beil’s “Seeing Syntax: Google Art Project and The Twenty-First-Century Period Eye” is one of the only academic pieces of writing published on GACP. Beil situates GAP in the history of art reproductions and explores the way representations shape how spectators look at art: Even as photographs – and especially reproductive photographs – claim to represent the visual world with a rigorous objectivity, they make use of pictorial conventions that must be decoded by their viewers. When these conventions are familiar to viewers, they imagine that they can see right through the reproduction to the original that it represents. However, when
conventions become outdated, it is the process itself that becomes most visible, rendering
the reproduction an opaque representation rather than a transparent window on the original
(Beil, 2013). Beil’s paper opens up academic discussion about GACP, but as a result of its
short length, its scope is limited. While the paper provides valuable insight into the practice
of looking at online images of artworks, the paper never discusses the “street view”
functionality, the integration of social media platforms, the “user galleries” or the Google
brand. In her thesis titled “A Rembrandt in Virtually Everyone’s Living Room?” , Joanna
Panagiotopoulou argues that GACP represents a new era of user-generated content where
online interactive tools encourage users to more actively engage with online content.
Panagiotopoulou primarily explores whether GACP is a more democratic method of art
consumption. She approaches this central research question through a series of user
interviews and surveys. These interviews and surveys include discussion of various topics
including the aura of art objects in a virtual museum, the museum’s role as an educator and
the prevalence of edutainment in initiatives like GACP. Panagiotopoulou also briefly
examines the museum’s social role in helping to either reaffirm or challenge power
structures that privilege some members of the public over others. While there are small
critiques woven throughout her thesis, including a small paragraph on the Project’s Western
bias. Panagiotopoulou largely characterizes GAP as an audience-driven project and praises
its democratic potential. GACP and similar initiatives are suggested as potential solutions to
help narrow the “semantic gap” between everyday experience and the knowledge of the
general public when it concerns high art” (Panagiotopoulou, 2010). In the Language of New
Media, Manovich (2009) examines the politics of code: In cultural communication, a code is
simply a neutral transport mechanism; usually it affects the messages transmitted with its
help code may also provide its own model of the world, its own logical system, or ideology;
subsequent cultural messages or whole languages created with this code will be limited by
its accompanying model, system, or ideology. Manovich’s (2013) paper “Database as
Symbolic Form” looks at the relationship between database and narratives. Manovich
explores databases including some of the first “virtual museums” housed on CD-ROMs. He
argues that over time, we have projected “the ontology of the computer onto culture itself.”
CD-ROMs, Video Games and Web pages contain their own narrative flow determined by the
database model that is used. Although his analysis of virtual museums housed on CD-ROMs
may be outdated now, much of the same broader theory can be applied to a narrower case
study of a website like GACP and can be synthesized with other digital heritage scholars. In
the twentieth century, curatorial practices moved towards being much more universal and
standardized between museums. The introduction of the computer seemed to impose a more
violent structure onto the museum and its collections: “the computer-enabled
systematization of documentation in the 1970s was a rationalizing discourse, aiming to
bring order to the bricolage of earlier twentieth-century curatorial practices”. Hooper-
Greenhill (2013) describes the “mythological art museum” and its reputation as a rigid,
tightly controlled environment for the educated and influential to bask in the presence of
high art. This myth is certainly not universal in reality, as many museums struggle with
underfunding or little public recognition. Stallabrass (2010) quite fiercely argues that while
many museums and galleries may face a reality that is quite different from this
mythological vision of the gallery, “both museums and galleries are committed to the
mystification of the objects that they display, holding to the fiction of a distinct realm of high
art that stands above the bureaucratized world of work and the complementary vulgar
blandishments of mass culture”. If the art gallery and the museum are associated with a
mythological rigidity, the online gallery is often linked to something quite the opposite.
Häyrinen (2012), while debating whether Google is a massive online museum, concludes that
Google is a gigantic voting, re-contextualization and marketing machine that connects information and materials without caring about academic degrees, institutional status or proper context. Google is a Wikipedia on a larger scale, with unlimited perspectives and without any publishing policy. Museums are not in the position to define the rules for this particular kind of museum. The only thing they can define is whether they will be part of it. The revolution of heritage authority has already taken place. There is a large-scale crowdsourcing is coming into being, where people are creating, commenting and manipulating digital heritage. Museums may give their support to it or they may ignore it, but they cannot prevent it from happening. The Virtual Museum of the Pacific (VMP) is a model for online community interaction with the Pacific Island collection of the Australian Museum, which operates within an understanding of objects and their meanings as dynamic, contested and negotiable. The VMP is a digital environment for exploring and defining the relationships among a selection of the 60,000 objects in the Pacific collection of the Australian Museum. Stuedahl (2011) attempts to understand how Web 2.0 and social media might open new possibilities for museums to collaborate with communities and lay professionals in cultural heritage knowledge creation. Digital technologies provide tools that in many ways overcome challenges of physical collaboration between museums and amateurs. But technologies also bring in new aspects of ordering, categorizing and systematizing knowledge that illuminates the different institutional and professional frameworks that writing local historical knowledge into digital forms. In a nutshell, GACP is an ambitious project from the internet giant which has opened a new debate in the literature of preserving and providing access to worldwide cultural artifacts.

Objectives
The main objectives of the study include:

- to explore various parameters on the basis of which the digital collection are categorized in Google Arts and Culture;
- to gauge the total number of items available in it as per their types;
- to identify the contribution of top ten artists, the medium of items and art movements that contribute the highest number of items in Google Arts and Culture collection; and
- to evaluate the contribution of top ten historical events and historical figures and the contribution of top ten leading countries having the maximum number of artworks.

Methodology
The study used an online search method for the collection of data to achieve the laid objectives. In a systematical manner, the official website of Google Arts and Culture was accessed via link (https://artsandculture.google.com/) during the period of 15 May to 31 May 2018, to harvest the required data. The website was browsed through the various options, reflected at the left side of its homepage, enlisting various searching options like artists, mediums, art movements, historical events, historical figures and places. All the relevant data as per each browsed option were collected and then tabulated in a MS Excel worksheet for further analysis and interpretation. Accordingly, the objectives of the study were successfully achieved, and findings were depicted in tables and figures along with discussions.

Data analysis and interpretation
*Total collection of Google Arts and Culture*
Google Arts and Culture (formerly known as Google Art Project) is a large database of worldwide culture and art. It explores the items of artwork, museums, libraries, archives,
historical events and figures, artists and organizations that are in cooperation with Google Cultural Institute. It also provides various important features: a person can zoom any artwork with high resolution; create and share their own build collection; watch relevant videos about the artwork; and virtually walk around the museums, libraries and historic sites. Google Art and Culture is now available in 18 different languages including English, Japanese, Indonesian, French, Italian, Polish and Portuguese. As on 31 May 2018, Google Arts and Culture includes a total of 6,272 of artists, 228 media and 121 art movements. Moreover, there are a total number of 641 historical movements; 6,250 historical figures; 9,692 places; 3,226 museum views; 1,702 zoom views; 39,607 featured videos; 5,528 featured stories; and 122 items organized by color and 954 organized by time (Table I).

Google Arts and Culture website interface and browsing options
Google Arts and Culture website is user-friendly, as its search interface increases the visibility of its contents for the users. The Google continuously update the platform’s search capabilities so that users can feel the ease of access to find artworks. Its main aim is to enrich the virtual experience for its online users. Users can find art by filtering their search into several categories including the artists, museums, type of work, art movements, place, historical figures and events. The filtered results are then displayed on the screen. This enables the users to search across numerous collections to find artworks that are useful for them and meets their area of interest. Figure 1 gives the glimpses of the same.

Arts and experiments of Google Art and Culture
Google Cultural Institute is a non-profit initiative that partners with cultural organizations to bring the world’s beautiful cultural heritage online. They build various tools and technologies for the cultural sector to showcase and share their gems, make them more widely accessible to a global audience. They are using state-of-the-art system for capturing paintings at ultra-high resolution. The different experiments are carried out at the crossroads of art and technology, created by artists and creative coders with the collection from Google arts and culture. Since its beginning, these coders have created an amazing experiment using Android, AI, Chrome and Voice Experiments. They are showcasing various projects in experiments along with useful tools and resources to inspire others to create the new experiment. Table II depicts a nascent view.

<table>
<thead>
<tr>
<th>S.no.</th>
<th>Total collection</th>
<th>Total no. of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Artists</td>
<td>6,272</td>
</tr>
<tr>
<td>2</td>
<td>Mediums</td>
<td>228</td>
</tr>
<tr>
<td>3</td>
<td>Art movements</td>
<td>121</td>
</tr>
<tr>
<td>4</td>
<td>Historical events</td>
<td>641</td>
</tr>
<tr>
<td>5</td>
<td>Historical figures</td>
<td>6,250</td>
</tr>
<tr>
<td>6</td>
<td>Places</td>
<td>9,692</td>
</tr>
<tr>
<td>7</td>
<td>Museums views</td>
<td>3,226</td>
</tr>
<tr>
<td>8</td>
<td>Zoom views</td>
<td>1,702</td>
</tr>
<tr>
<td>9</td>
<td>Featured videos</td>
<td>39,607</td>
</tr>
<tr>
<td>10</td>
<td>Featured stories</td>
<td>5,528</td>
</tr>
<tr>
<td>11</td>
<td>Organized by color</td>
<td>122</td>
</tr>
<tr>
<td>12</td>
<td>Organized by time</td>
<td>954</td>
</tr>
</tbody>
</table>

Table I. Total collection of Google Arts and Culture
Top ten artists of Google Art and Culture

Google Arts and Culture collections map shows that Americans and Europeans are dominant in most aspects and in all sections of the collections. It is evident from the option “Latest news” that the project is making a serious effort to display the diverse artworks of artists. The recent topics include the Raja Ravi Varma Heritage Foundation in Bangalore and Peranakan clothing of China without unraveling centuries of bias. In the artist’s section of Google Arts and Culture, the total number of artworks created by a particular artist is displayed. It also provides the detailed description about the artists like the date of birth and death; his/her notable works; and the medium of artwork and importance of artists in art history. This section also helps to discover the other similar type of works along with the physical description. The list of top ten artists with their highest contribution is compiled. For observing the list, see Table III.

Top ten mediums of Google Art and Culture

The Google Art and Culture hosts millions of artifacts and artwork of leading artists around the world ranging from prehistory to the modern history. In art, the medium is simply a material used by artists to create their artwork. It provides historical details about the type of item along with its uses from prehistoric times. This sections also provide the links of similar other artwork of the same type of medium and total number of artwork created from the particular medium. In Google project, the maximum number of type of medium is etching, followed by paper and engraving. The least number of artifacts is made on textiles. For clear understanding, see Table IV.
Top ten art movements of Google Art and Culture

In Google Arts and Culture, users can zoom any artwork of his/her interest along with the item details also. It provides the physical characteristics detail about the item like type, size, material, artist, country of origin, location, period and subject category. Under zoom view of any artwork, it also provides the scholarly and conceptual information order to enhance the understanding of the work. Any museum, library or achieve is allowed to include as many materials as they wanted to contribute, and the level of information varies by museum, artwork or artists. Google Arts and Culture includes various art movements on the list, some of the top ten art movements and their number of items included in their movement. The highest number of items included in Baroque (21,926) followed by Modern Art(10,484) and the least number of items was in Northern Renaissance (2,843) items as shown in Table V.

Top ten historical events of Google Art and Culture

Google Arts and Culture was launched on 1 February 2011 by Google, in cooperation with 17 international museums, including the Tate Gallery, London; the Metropolitan Museum of Art, NY City; and the Uffizi, Florence. It is an effort to make important cultural material available and accessible to everyone and to digitally preserve it to educate and inspire future generations. The main contribution to Google’s platforms allows for interlinking with other institution’s collection, enables greater global accessibility. It provides a detailed history of the event and time when the event has started and till which year it ends. This section also shows the similar like historical events along with other details also. Table VI gives a clear view.

<table>
<thead>
<tr>
<th>S. no.</th>
<th>Name of the artists</th>
<th>No. of contributing items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alfred Eisenstaedt</td>
<td>192,332</td>
</tr>
<tr>
<td>2</td>
<td>Carl Mydans</td>
<td>115,756</td>
</tr>
<tr>
<td>3</td>
<td>George Silk</td>
<td>96,921</td>
</tr>
<tr>
<td>4</td>
<td>Margaret Bourke-White</td>
<td>44,286</td>
</tr>
<tr>
<td>5</td>
<td>David Scherman</td>
<td>30,131</td>
</tr>
<tr>
<td>6</td>
<td>Gordon Parks</td>
<td>11,493</td>
</tr>
<tr>
<td>7</td>
<td>George Rodger</td>
<td>5,490</td>
</tr>
<tr>
<td>8</td>
<td>George Hendrik Breitner</td>
<td>2,804</td>
</tr>
<tr>
<td>9</td>
<td>Jacques Callot</td>
<td>2,373</td>
</tr>
<tr>
<td>10</td>
<td>James Abbott McNeill Whistler</td>
<td>2,333</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S. no.</th>
<th>Mediums</th>
<th>No. of contributing items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Etching</td>
<td>66,851</td>
</tr>
<tr>
<td>2</td>
<td>Paper</td>
<td>65,472</td>
</tr>
<tr>
<td>3</td>
<td>Engraving</td>
<td>39,597</td>
</tr>
<tr>
<td>4</td>
<td>Watercolour painting</td>
<td>25,716</td>
</tr>
<tr>
<td>5</td>
<td>Oil paint</td>
<td>24,059</td>
</tr>
<tr>
<td>6</td>
<td>Ink</td>
<td>24,002</td>
</tr>
<tr>
<td>7</td>
<td>Rock</td>
<td>22,122</td>
</tr>
<tr>
<td>8</td>
<td>Graphite</td>
<td>21,244</td>
</tr>
<tr>
<td>9</td>
<td>Photograph</td>
<td>19,961</td>
</tr>
<tr>
<td>10</td>
<td>Textile</td>
<td>19,131</td>
</tr>
</tbody>
</table>
Google Arts and Culture provides access to the notable amount of information about the included artwork in the collection. In addition to standard metadata, there is another physical description of every artwork and additional links to the related content also. The works of the artists are also relatively diverse, representing the historical sites and figures in many countries around the world and the content ranging from street art fashion to valuable paintings and sculptures. In historical figures, they provide a list of historical figures which are popular in respective fields. See Table VII for brief understanding.

### Table V. Top ten art movements of Google Art and Culture

<table>
<thead>
<tr>
<th>S. no.</th>
<th>Art movements</th>
<th>No. of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Baroque</td>
<td>21,926</td>
</tr>
<tr>
<td>2</td>
<td>Modern art</td>
<td>10,484</td>
</tr>
<tr>
<td>3</td>
<td>Renaissance</td>
<td>7,273</td>
</tr>
<tr>
<td>4</td>
<td>Street art</td>
<td>5,709</td>
</tr>
<tr>
<td>5</td>
<td>Dutch Golden Age</td>
<td>5,426</td>
</tr>
<tr>
<td>6</td>
<td>Realism</td>
<td>4,774</td>
</tr>
<tr>
<td>7</td>
<td>Ukiyo-e</td>
<td>4,738</td>
</tr>
<tr>
<td>8</td>
<td>Contemporary art</td>
<td>4,591</td>
</tr>
<tr>
<td>9</td>
<td>Romanticism</td>
<td>4,291</td>
</tr>
<tr>
<td>10</td>
<td>Northern renaissance</td>
<td>2,843</td>
</tr>
</tbody>
</table>

### Table VI. Top ten historical events of Google Art and Culture

<table>
<thead>
<tr>
<th>S. no.</th>
<th>Historical events</th>
<th>No. of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>World War II</td>
<td>32,094</td>
</tr>
<tr>
<td>2</td>
<td>The Holocaust</td>
<td>16,925</td>
</tr>
<tr>
<td>3</td>
<td>Cold War</td>
<td>14,570</td>
</tr>
<tr>
<td>4</td>
<td>World War I</td>
<td>4,392</td>
</tr>
<tr>
<td>5</td>
<td>Protests of 1968</td>
<td>3,811</td>
</tr>
<tr>
<td>6</td>
<td>May 1968 events in France</td>
<td>3,792</td>
</tr>
<tr>
<td>7</td>
<td>Pacific War</td>
<td>2,290</td>
</tr>
<tr>
<td>8</td>
<td>Korean War</td>
<td>2,678</td>
</tr>
<tr>
<td>9</td>
<td>Cuban Missile Crisis</td>
<td>2,115</td>
</tr>
<tr>
<td>10</td>
<td>First Indochina War</td>
<td>2,058</td>
</tr>
</tbody>
</table>

### Table VII. Top ten historical figures of Google Art and Culture

<table>
<thead>
<tr>
<th>S. no.</th>
<th>Historical figures</th>
<th>No. of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Richard Nixon</td>
<td>17,919</td>
</tr>
<tr>
<td>2</td>
<td>Lyndon B. Johnson</td>
<td>14,492</td>
</tr>
<tr>
<td>3</td>
<td>John F. Kennedy</td>
<td>14,154</td>
</tr>
<tr>
<td>4</td>
<td>Nikita Khrushchev</td>
<td>11,108</td>
</tr>
<tr>
<td>5</td>
<td>Dwight D. Eisenhower</td>
<td>9,820</td>
</tr>
<tr>
<td>6</td>
<td>Harry S. Truman</td>
<td>6,821</td>
</tr>
<tr>
<td>7</td>
<td>Robert F. Kennedy</td>
<td>5,550</td>
</tr>
<tr>
<td>8</td>
<td>Franklin D. Roosevelt</td>
<td>4,756</td>
</tr>
<tr>
<td>9</td>
<td>Charles de Gaulle</td>
<td>4,091</td>
</tr>
<tr>
<td>10</td>
<td>Jacqueline Kennedy Onassis</td>
<td>3,017</td>
</tr>
</tbody>
</table>
**Top ten places of Google Art and Culture**

Google Art and Culture in collaboration with art museums, heritage sites, archives and other cultural institutions around the world makes global art and culture visible to the rest of the world. This project allows the users to explore paintings, sculpture, prints, drawing, photographs, decorative arts and other objects in this collection. The artwork contributed to the Google art represents many areas from the museum’s comprehensive collection, from second millennium BCE to the twentieth century from the Europe, America, Asia, North Africa and the Mediterranean. Place wise, the artwork is categorized according to the country of origin. It provides the historical detail of every artwork in a particular country. Table VIII offers a lucid picture.

**Top ten museum view countries of Google Art and Culture**

For centuries, cultural institutions like libraries, museums, archives and organizations all over the world have collected and safeguarded the history and heritage. Powerful technologies can amplify this mission while preserving these artifacts for the worldwide audience today and tomorrow. In country-wise search option, it displays the overall history of the particular country along with other information like the number of states and districts and union territories. The collection of a particular country is shown along with the physical description of the artwork. This section also shows the similar stories of artwork and the total number of items available in Google Art and Culture from a particular country. For clear view, see Table IX.

<table>
<thead>
<tr>
<th>S. no.</th>
<th>Places</th>
<th>No. of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>USA</td>
<td>778,716</td>
</tr>
<tr>
<td>2</td>
<td>UK</td>
<td>75,676</td>
</tr>
<tr>
<td>3</td>
<td>France</td>
<td>60,259</td>
</tr>
<tr>
<td>4</td>
<td>Poland</td>
<td>57,631</td>
</tr>
<tr>
<td>5</td>
<td>Germany</td>
<td>59,396</td>
</tr>
<tr>
<td>6</td>
<td>Japan</td>
<td>41,285</td>
</tr>
<tr>
<td>7</td>
<td>Italy</td>
<td>37,566</td>
</tr>
<tr>
<td>8</td>
<td>Chicago</td>
<td>35,480</td>
</tr>
<tr>
<td>9</td>
<td>India</td>
<td>29,594</td>
</tr>
<tr>
<td>10</td>
<td>China</td>
<td>29,129</td>
</tr>
</tbody>
</table>

**Table VIII.**

<table>
<thead>
<tr>
<th>S. no.</th>
<th>Countries</th>
<th>No. of museums</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>USA</td>
<td>110</td>
</tr>
<tr>
<td>2</td>
<td>India</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>UK</td>
<td>26</td>
</tr>
<tr>
<td>4</td>
<td>South Africa</td>
<td>24</td>
</tr>
<tr>
<td>5</td>
<td>Indonesia</td>
<td>23</td>
</tr>
<tr>
<td>6</td>
<td>Brazil</td>
<td>22</td>
</tr>
<tr>
<td>7</td>
<td>Portugal</td>
<td>17</td>
</tr>
<tr>
<td>8</td>
<td>Hong Kong</td>
<td>13</td>
</tr>
<tr>
<td>9</td>
<td>Pakistan</td>
<td>11</td>
</tr>
<tr>
<td>10</td>
<td>France</td>
<td>9</td>
</tr>
</tbody>
</table>

**Table IX.**
Limitations and direction for future research

Google Art and Project has a digital collection of painting, photographs, historical events, notable figures, prints and sculptures of thousands of resources from almost all the countries of the world. Keeping in the view the time constraints in consideration, the contributions of only top ten artists, art movement and type of item, historical events, historical figures and countries are explored and analyzed for the study. The study suggests that future researches can be conducted on the other aspects which are not covered in the present study.

Conclusions

The study tried to show that digital technologies are having the significant impact on the preservation of world-wide art and culture. Within this framework, when it comes to promoting and protecting the diversity of world culture and art in a new environment, the progress made by some countries could be extremely useful for others. Indeed, many of the initiatives in relation to access, creativity and cultural industries for increasing the visibility of world culture and art. The present study is an effort to explore Google Art and Culture. This platform gives users to explore world-renowned artifacts, artwork, museums, archives and organizations that are in cooperation with Google Cultural Institute. It not only provides this but also realizes the virtual experiences of worldwide art and culture sitting at home. It provides users with significant features like any user can zoom into their views into high-resolution images with specifications; can create their own collection; and is able to watch, share and virtually walk around the museums and historical sites. Users can also browse the collection by sorting options by color, time, theme and popularity.

References


Google Art and Project (2018), available at: www.digitalmeetsculture.net/article/the-google-art-project/


About the authors

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Dr Shabir Ahmad Ganaie is currently working as an H O D at the Department of Library and Information Science, University of Kashmir 190006. He has an MLIB degree and PhD in Library Science and has authored many papers and book chapters both national and international. The author has also participated in various national and international conferences/seminars and workshops.
When will European Muslim population be majority and in which country?

Pierre Rostan and Alexandra Rostan

Higher Colleges of Technology, Abu Dhabi, United Arab Emirates

Abstract

Purpose – The purpose of this paper is to estimate the years the European Muslim population will be majority among 30 European countries.

Design/methodology/approach – The methodology/approach is to forecast the population of 30 European countries with wavelet analysis combined with the Burg model which fits a \( p \)th order autoregressive model to the input signal by minimizing (least squares) the forward and backward prediction errors while constraining the autoregressive parameters to satisfy the Levinson–Durbin recursion, then relies on an infinite impulse response prediction error filter. Three scenarios are considered: the zero-migration scenario where the authors assume that the Muslim population has a higher fertility (one child more per woman, on average) than other Europeans, mirroring a global pattern; a 2017 migration scenario: to the Muslim population obtained in the zero-migration scenario, the authors add a continuous flow of migrants every year based on year 2017; the mid-point migration scenario is obtained by averaging the data of the two previous scenarios.

Findings – Among three scenarios, the most likely mid-point migration scenario identifies 13 countries where the Muslim population will be majority between years 2085 and 2215: Cyprus (in year 2085), Sweden (2125), France (2135), Greece (2135), Belgium (2140), Bulgaria (2140), Italy (2175), Luxembourg (2175), the UK (2180), Slovenia (2190), Switzerland (2195), Ireland (2200) and Lithuania (2215). The 17 remaining countries will never reach majority in the next 200 years.

Originality/value – The growing Muslim population will change the face of Europe socially, politically and economically. This paper will provide a better insight and understanding of Muslim population dynamics to European governments, policymakers, as well as social and economic planners.

Keywords European population, Muslim population, Forecasts, Wavelet analysis, Burg model

Paper type Research paper

1. Introduction

This paper presents estimates of the years the European Muslim Population will be majority in 30 European countries using spectral analysis. Europe’s population represents about 10 per cent of the world population and about 5 per cent of Europe’s population is Muslim. Europe has experienced a refugee crisis that reached a peak in 2015 with an influx of refugees coming mainly from Muslim countries across the Mediterranean Sea or overland

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JEL classification – C53, E37

No potential conflict of interest was reported by the authors.
through Southeast Europe. Refugees have come primarily from Syria, Afghanistan, Iraq and Eritrea. In all, 86 per cent of them are Muslims based on the top ten origins of refugees from 2010 to 2016 (Pew Research Centre, 2017). Refugees include two main groups: asylum seekers and economic migrants.

The growing Muslim population has already changed the face of Europe socially, politically and economically. Socially, the Muslim community experiences more communitarianism than the Christian community does; the latter being more fragmented in terms of churches, beliefs and practice. Muslims are strongly attached to their beliefs and their roots and keep usually a relationship with their country of origin if they are migrants. Politically, the Muslim community includes more left-wing voters, leftist political parties being usually in favor of integrating Muslims migrants to the European society (Dancygier, 2018). Economically, Muslims are less educated than non-Muslims are, a majority of them work in the construction and the manufacturing sectors. The second or third generations of Muslim migrants may have access to education, get diplomas and occupy white-collar employments. They can also be involved in politics. There have been many examples of Muslim citizens having succeeded in politics where they have occupied key political roles of deputies, ministers or mayors of large cities, for example the current mayor of London, UK, Mr Sadiq Aman Khan, a practising Muslim of Pakistani origin who took up office in 2016 or Mrs Aygül Özkan who served as Minister of Social Affairs, Women, Families, Health and Integration between 2010 and 2013, being the first ever German politician of Turkish descent and a Muslim serving as minister. The greater the proportion of Muslims in a country, the faster the change will be in the society: construction of mosques, prayer calls from loudspeakers, open air worships, halal products available in supermarkets and produced locally, compatible workload and adjustable working hours with Ramadan constraints are examples of such changes in Europe. In recent years, new laws targeting Muslims have been voted such as laws to ban Burqa, headscarves and veils in public (Weaver, 2017) or laws against family reunification to limit people’s ability to reunify to control immigration in Denmark, The Netherlands, Germany, Norway or the UK.

European political decisions may also be more and more subject to foreign governments’ intrusion. For example, most of the Turkish migrant associations in Germany, religious, political and business-oriented, are characterized by transnational linkages where they maintain contacts to political representatives in both countries, Germany and Turkey (Amelina and Faist, 2008). Another example is the regular interference of the prime minister of Turkey telling Turks living in Europe that they do not need to assimilate into their host societies, urging them to make more babies, advising them to become more engaged in society and more influential in politics (Press, 2018). Funds from the Kingdom of Saudi Arabia (KSA) which have financed the construction of mosques and the spreading of Wahhabism in Europe have also come with the cost of a swelling influence of KSA on worshipers and domestic affairs. Wahhabism is the radical ideology dominating KSA, freely preached by government-backed clerics. Belgium has voiced concerns over the spread of KSA-backed Wahhabism throughout the country and the rest of Europe (PressTV, 2017) and has terminated KSA’s half-century old lease of the Grand Mosque in Brussels over concerns it was promoting radicalism. France and Germany have also shut mosques suspected of radicalizing and encouraging young Muslims to travel to war zones including Syria and Iraq (AFP, 2018). Finally, anti-Islam political parties have gained support in many European countries in reaction to the uncontrolled wave of refugees flooding Europe where most governments have been overwhelmed by the influx of migrants, situation exacerbated by a string of terror attacks undertaken by radical Islamists in the UK, Belgium, France, Russia and Germany that have pressured European governments to bolster security
measures and to deal with a very angry local population. All these social, political and economic changes will bring periods of adjustment that may be painful for the European society – some talk of shock of civilizations – and will depend on the degree of openness and tolerance of the communities toward each other and their willingness to build a balanced European society enriched with a diversity of beliefs and cultures.

2. Literature review

Wavelet analysis, a tool of signal processing, is used in Physics to model physical phenomena such as electrical, audio or seismic signals which propagate through space in waveforms. Wavelets mimic signals with specific properties that make them useful for signal processing. Signal processing focuses on the analysis, synthesis, and modification of signals. Spectral (or spectrum) analysis focuses on data analysis of signals. From a finite record of a stationary data sequence, spectral analysis estimates how the total power is distributed over frequency (Stoica and Moses, 2005). Spectral analysis may reveal hidden periodicities in data, which are to be associated with cyclic behavior or recurring processes in the field of meteorology or astronomy, for example.

Forecasters using wavelet analysis have focused on the Discrete Wavelet Transform due to several not tractable properties of continuous wavelet transform such as highly redundant wavelet coefficients (Valens, 1999), infinite number of wavelets in the wavelet transform and no analytical solutions found for most functions of the wavelet transforms. Renaud et al. (2002) proposed a wavelet-based forecasting method using redundant “à trous” wavelet transform and multiple resolution signal decomposition. Conejo et al. (2005) detailed a forecasting day-ahead electricity prices based on the wavelet transform and ARIMA models. Schlüter and Deuschle (2010) were able to capture seasonalities with time-varying period and intensity, incorporated the wavelet transform to improve forecasting methods. Tan et al. (2010) proposed a price forecasting method based on wavelet transform combined with ARIMA and GARCH models. Kao et al. (2013) integrated wavelet transform, multivariate adaptive regression splines (MARS), and support vector regression (SVR called Wavelet-MARS-SVR) to address the problem of wavelet sub-series selection and to improve forecast accuracy. Ortega and Khashanah (2014) proposed a wavelet neural network model for the short-term forecast of stock returns from high-frequency financial data. Kriechbaumer et al. (2014) showed the cyclical behavior of metal prices. With wavelet analysis, they were able to capture the cyclicality by decomposing a time series into its frequency and time domain. They presented a wavelet-autoregressive integrated moving average (ARIMA) approach for forecasting monthly prices of aluminum, copper, lead and zinc. He et al. (2014) proposed an entropy optimized wavelet-based forecasting algorithm to forecast the exchange rate movement. Rostan et al. (2015a) appraised the financial sustainability of the Spanish pension system using Spanish population forecasts. Berger (2016) transformed financial return series into its frequency and time domain via wavelet decomposition to separate short-run noise from long-run trends and assess the relevance of each frequency to value-at-risk (VaR) forecast. Rostan et al. (2017) applied signal processing to yield curve forecasting with a robust outcome when benchmarked to the Diebold and Li (2006) model. With a refined methodology using multiscale principal component analysis to take into account the co-dynamics of age groups, Rostan and Rostan (2017) forecasted European and Asian populations with signal processing. Rostan and Rostan (2018a) illustrated with market data the versatility of wavelet analysis to the forecast of financial times series with distinctive properties. Rostan and Rostan (2018b, 2018c) applied wavelet analysis to the forecasts of Spanish (2018b) and Greek (2018c) economies. Rostan and Rostan (2018d) applied signal processing to the forecast of the Saudi population.
Section 3 presents the five-step methodology. Section 4 gathers the results and Section 5 concludes.

3. Methodology
The objective of the paper is to present an application of wavelet analysis to the forecasts of Muslim population for 30 European countries. We estimate the future years when the Muslim population will be majority population for 30 European countries. The methodology, improved with a de-noising and compression step, is derived from Rostan and Rostan (2018a) and requires five steps illustrated with the time series of the Europe total population (30 countries). Figure 1 illustrates the series of the total population and the 0-4-year age group from 1950 to 2015 by step of Five years (14 data) released by the Population Division of the United Nations Secretariat. The 0-4-year age group is involved in the 5-step methodology since we assume that the 0-4-year age group is a good proxy (after adjustment for scale) of the fertility rate. Figure 1 illustrates two opposite trends, a growing European total population but a declining 0-4-year age group which, as a proxy of the fertility rate, is doomed to decline in the future. We clearly anticipate that the European population (30 countries) will get older in future years. However, there is an external factor not reflected by these historical data, the recent inflow of Muslim refugees following the European refugee crisis which has started in 2015 and that may revert the trend of the fertility rate, assuming that the Muslim population has higher fertility (one child more per woman, on average) than other Europeans, mirroring a global pattern (Pew Research Centre, 2017).

Figure 1. The European total population and the 0-4-year age group (30 countries) for the 1950-2015 period obtained by census

3.1 Step 1: de-noising and compression of the first-order difference of the European total population time series

We compute the first-order difference of the European total population series to transform non-stationary series into stationary series. We apply the Augmented Dickey-Fuller test to the time series before and after differentiation: before differentiation, the time series are non-stationary (i.e. existence of a unit root) and after differentiation the time series is stationary (rejection of the existence of a unit root). The choice of this transformation relies on the fact that wavelet analysis presents a more accurate forecasting ability with stationary time series rather than non-stationary time series. Refer for example to Rostan and Rostan (2018a) for a demonstration.

We then de-noise the series using a one-dimensional de-noising and compression-oriented function using wavelets. The function is called “wdencmp” in Matlab (Misiti et al., 2015). The underlying model for the noisy signal is of the form:

\[ s(n) = f(n) + \sigma e(n) \]  

(1)

where time \( n \) is equally spaced, \( e(n) \) is a Gaussian white noise \( N(0,1) \) and the noise level \( \sigma \) is supposed to be equal to 1. The de-noising objective is to suppress the noise part of the signal \( s \) and to recover \( f \).

The de-noising procedure proceeds in three steps:

1) Decomposition. We choose the wavelet \( sym4 \) and choose the level 2-decomposition. \( Sym4 \) is a symlets wavelet of order 4 used as the mother wavelet for decomposition and reconstruction. It is a nearly symmetrical wavelet belonging to the family of Symlets proposed by Daubechies (1994). We compute the wavelet decomposition of the signal \( s \) at Level 2.

2) Detail coefficients thresholding. For each level from 1 to 2, we select a threshold and apply soft thresholding to the detail coefficients.

3) Reconstruction. We compute wavelet reconstruction based on the original approximation coefficients of level 2 and the modified detail coefficients of levels from 1 to 2.

Like de-noising, the compression procedure contains three steps:

1) Decomposition. 2) Detail coefficient thresholding. For each level from 1 to 2, a threshold is selected and hard thresholding is applied to the detail coefficients. 3) Reconstruction. The difference with the de-noising procedure is found in Step 2. The notion behind compression is based on the concept that the regular signal component can be accurately approximated using a small number of approximation coefficients (at a suitably selected level) and some of the detail coefficients.

We illustrate in Figures 2 (appendix material) the European total population (14 data) before differentiation (top figure), after differentiation (middle) and after de-noising and compression (bottom).

3.2 Step 2: wavelet decomposition

We decompose the signal after being differentiated, de-noised and compressed. The signal, i.e. the time series of the European total population transformed at step 1 (13 data), is decomposed into decomposed signals \( cAs \) named approximations and \( cDs \) named details. The Discrete Wavelet Transform is a kind of decomposition scheme evaluated by passing the signal through lowpass and highpass filters (Corinthios, 2009), dividing it into a lower
Figure 2.
Observed European total population (30 countries) from 1950 to 2015 (14 data, top), first-order difference of the European total population (middle), de-noising and compression of the first-order difference of the European total population (bottom).
frequency band and an upper band. Each band is subsequently divided into a second level lower and upper bands. The process is repeated, taking the form of a binary, or “dyadic” tree. The lower band is referred to as the approximation $cA$ and the upper band as the detail $cD$. The two sequences $cA$ and $cD$ are downsampled. The downsampling is costly in terms of data: with multilevel decomposition, at each one-level of decomposition the sample size is reduced by half (in fact, slightly more than half the length of the original signal, since the filtering process is implemented by convolving the signal with a filter. The convolution “smears” the signal, introducing several extra samples into the result). Therefore, the decomposition can proceed only until the individual details consist of a single sample. Thus, the number of levels of decomposition will be limited by the initial number of data of the signal. In this paper, we apply a level of decomposition that fits best the data of each variable as explained at the end of the Methodology section. Figures 3 (appendix material) illustrates the 4th-level decomposition/reconstruction of the transformed European total population (after differentiation and de-noising/compression, 13 points). We observe in Figures 3 that details $cDs$ are small and look like high-frequency noise, whereas the approximation $cA4$ contains less noise than does the initial signal. In addition, the higher the level of decomposition, the lower the noise generated by details. For a better understanding of signal decomposition using discrete wavelet transform, refer to the methodology section of Rostan and Rostan (2018a).

3.3 Step 3: Burg extension of approximations and details
We apply Burg extension to $cA$ and $cD$. To run the Burg extension, we apply an autoregressive $p$th order from historical data, in this paper we find the optimal $p$th order by minimizing the Root Mean Square Error for a given level of decomposition/reconstruction as explained in the last section “Identifying the optimal level of decomposition/reconstruction” of the methodology section. For instance, in 2015, when forecasting European total population for the subsequent years, the optimal $p$th order is 12. Given $x$ the decomposed signal (which is $cA$ or $cD$), we generate a vector $a$ of all-pole filter coefficients that model an input data sequence using the Levinson-Durbin algorithm (Levinson, 1946; Durbin, 1960). We use the Burg (1975) model to fit a $p$th order autoregressive (AR) model to the input signal, $x$, by minimizing (least squares) the forward and backward prediction errors while constraining the AR parameters to satisfy the Levinson-Durbin recursion. $x$ is assumed to be the output of an AR system driven by white noise.

Vector $a$ contains the normalized estimate of the AR system parameters, $A(z)$, in descending powers of $z$:

$$H(z) = \frac{\sqrt{e}}{A(z)} = \frac{\sqrt{e}}{1 + a_2 z^{-1} + \ldots + a_{(p+1)} z^{-p}}$$

Since the method characterizes the input data using an all-pole model, the correct choice of the model order $p$ is important. In Figure 4 (appendix material), the prediction error, $e(n)$, can be viewed as the output of the prediction error filter $A(z)$, where $H(z)$ is the optimal linear predictor, $x(n)$ is the input signal, and $\hat{x}(n)$ is the predicted signal.

In a last step, the Infinite Impulse Response (IIR) filter extrapolates the index values for each forecast horizon. IIR filters are digital filters with infinite impulse response. Unlike finite impulse response (FIR) filter, IIR filter has the feedback (a recursive part of a filter) and is also known as recursive digital filter.
4th-level decomposition of the transformed European total population, 30 countries, 13 data (after differentiation and de-noising/compression) using one-dimensional discrete wavelet analysis.

Initial signal: First-order difference of European Population after de-noising/compression

Approximation cA1

Approximation cA4

Detail cD1

Detail cD4
3.4 Step 4: Wavelet reconstruction

We recompose the forecasted signals after Burg extension using the methodology illustrated in Figure 5 for the 3rd-level decomposition/reconstruction diagram. After reconstruction, we retransform the time series of the first-order difference of European total population into European total population absolute level.

Based on steps 1 to 4, we illustrate in Figure 6 the forecasts of the European total population and the 0-4-year age group (30 countries) for the 2015-2220 period with spectral analysis (4th level of decomposition/reconstruction, pth-order = 12). As expected the uptrend of the total population and the downtrend of the 0-4-year age group are confirmed, which will make the European population getting older.

3.5 Step 5: forecasting the Muslim population

3.5.1 Zero-migration scenario. Once we have forecasted the European total population (30 countries) and the 0-4 age group of the European population (30 countries) following the four-step methodology, we forecast the Muslim population in a zero-migration scenario: we assume that all refugee flows will stop after 2015, which is considered the most conservative approach. The reader may find this assumption surprising, knowing that more refugees arrived after 2015 but we adjust this additional inflow of refugees' post 2015 with the fact that we apply the 2016 proportions of the European Muslim population for the 30 countries collected by the Pew Research Centre (2017) to the 2015 UN data. The year 2015 is the base year of our forecasts. Assuming that the Muslim population has higher fertility (one child more per woman, on average) than other Europeans, mirroring a global pattern (Pew Research Centre, 2017), we will compute the newborn Muslim babies every five years. For example, assuming that in 2015 the proportion of Muslims is 5 per cent for the entire European Muslim population (30 countries), 5 per cent of 493,283,559 is 24,664,178, the total number of European Muslims in year 2015. In year 2020, five year later, 5 per cent of 498,585,190, the forecasted value obtained with spectral analysis, is 24,929,260. We assume that the proportion of Muslim babies between year 2015 and 2020 is also 5 per cent. Since Muslims have higher fertility (one child more per woman, on average), we assume that 5 per cent of the age group 0-4 years of the European population (30 countries) will be added to the Muslim population of 24,929,260, i.e. 5 per cent of 27,036,968 equal to 1,351,848 added to 24,929,260, equal to 26,281,108, or 5.27 per cent of 498,585,190. The proportion of 5.27 per cent will be applied to the computation of the estimated number of new Muslim babies for the period 2020-2025 and to the proportion of the Muslim population in 2025; the two numbers will be added to compute the estimated number of Muslims in 2025, we get 5.5 per cent of the total European population (30 countries) and so on. Therefore, we also apply the 4-step methodology to the forecast of the 0-4 age group of the European population (30 countries) as illustrated in Figure 6, because estimates of the 0-4 age group are needed to compute the number of new Muslim babies every 5 years. Finally, we illustrate the forecasts
of the European Muslim total population versus the European total population (30 countries) in Figure 7.

The European Muslim population should more than tripled (3.6 times) in the next 200 years, from 24,664,178 (5 per cent of the total population) in 2015 to 89,585,190 (14.13 per cent) in 2220.

3.5.2 2017 Migration scenario. To the Muslim population obtained in the Zero-migration Scenario in section 3.5.1., assuming a higher Muslim fertility rate, we add a continuous flow of migrants every year based on year 2017. Figure 8 illustrates the number of first-time asylum applicants in 2017 in 30 countries (Eurostat, 2017).

Germany (31 per cent of the total first-time asylum applicants), Italy (18 per cent), France (14 per cent) and Greece (8 per cent) received most of the first-time asylum applicants (70 per cent) and will therefore be the most impacted by this scenario. We use the 2017 number of first-time asylum applicants as a proxy of the annual flow of migrants, assumed to be continuous and constant in the subsequent years. Based on the

Figure 5.
Diagram of a 3rd-level wavelet decomposition/reconstruction tree to forecast the initial signal $s(t)$.

Notes: (*) Extended with Burg extension; (+) Extended by reconstruction of extended approximation and detail.
top ten origins of refugees from 2010 to 2016, 86 per cent of them are Muslims (Pew Research Centre, 2017). We will therefore assume that 86 per cent of the first-time asylum applicants are Muslims. We illustrate in Figure 9 the trend of the number of first-time asylum applicants for the 30 countries between 2008 and 2017. There is a net decline (-48 per cent) between year 2015 (the peak of the refugee crisis) and 2017 following drastic plans to stop the influx of refugees in many countries. These plans have involved the building of fences, stringent border controls and refusal from many countries of meeting the quotas of refugees instituting by the European Union’s migration commission. The choice of the year 2017 as a proxy is explained by the fact that 1)it is the most recent known data and 2)the 2017 point is aligned with points 2008 to 2014 as illustrated by the dot line joining points 2008 and 2017 in Figure 9. 2015 and 2016 points are outliers. Although the trend of the number of first time asylum applicants is positive, we assume in this scenario a flat trend of the number asylum applicants in future years based on year 2017 data.

3.5.3 Mid-point migration scenario. The mid-point migration scenario data are obtained by averaging the data of the two previous scenarios.

3.6 Assessing the forecasting ability of spectrum analysis
An additional exercise is to assess the forecasting ability of spectrum analysis. We measure the forecasting error over the last five in-sample data of European total population time series for 30 countries for the years 1995, 2000, 2005, 2010 and 2015. We benchmark spectrum analysis to ARIMA(1,2,1) forecasting model (Box and Jenkins, 1976; Baillie and Bollerslev, 1992; Box et al., 1994) applied to the absolute level of European total population
We use the Root Mean Error Square criteria (forecasts versus historical data) to compute the error of forecasting. Spectrum analysis beats ARIMA(1,2,1) model with a RMSE of 5,341,392 versus 102,403,988 with ARIMA. Figure 8 illustrates the European total population forecasts with the two models.

We choose the ARIMA(1,2,1) model since it best fits the data of the European total population (30 countries). We identify the ARMA lags $p=1$ and $q=1$ with the Bayesian information criterion (BIC) to the European total population time series (9 data). For this purpose, we estimate several models with different $p$ and $q$ values at different levels of differencing. For each estimated model, we compute the loglikelihood objective function value. Then, we input the loglikelihood value to compute the BIC measure of fit which penalizes for complexity. This methodology is implemented in MATLAB using the econometrics toolbox.

To formally identify the ARMA lags, we fit several models with different lag choices, making the degree of differencing (i.e. the “I” of ARIMA) varying from 0 to 2. We fit all combinations of ARMA$(p,q)$ for $p=1, \ldots, 2$ and $q=1, \ldots, 2$ (a total of 4 models per degree of differencing). We store the loglikelihood objective function and number of coefficients for each fitted model. We calculate the BIC for each fitted model. We obtain four output BIC matrices for no differencing, the first, second and third order differencing. In the output BIC matrix below, the rows correspond to the AR degree ($p$) and the columns correspond to the MA degree ($q$). The best values in the BIC matrices are the smallest BIC value. The smallest value is obtained with the second order differencing:

Selected model: ARIMA($p,d,q$) = ARIMA(1, 2, 1)

Source: Eurostat (2017)

Figure 9. Total number of first time asylum applicants in 30 European countries between 2008 and 2017

Figure 8. Number of first-time asylum applicants in 2017 in 30 European countries

Source: Eurostat (2017)
3.7 Identifying the optimal level of decomposition/reconstruction

Finally, we focus on the optimal level of decomposition/reconstruction of our forecasting model. We make the level varying from 1 to 7. Levels 1, 2 and 3 return an error message. Figure 11 (appendix material) illustrates the RMSE computed on the last

Figure 10. European total population (30 countries) forecasts for the in-sample years 1995, 2000, 2005, 2010 and 2015, ARIMA(1,2,1) versus Spectrum Analysis (level-4 decomposition/reconstruction, $p^th$ order = 8)

Figure 11. RMSE versus level of decomposition/reconstruction

Minimum RMSE = 5,341,392
5 in-sample years of our database for the years 1995, 2000, 2005, 2010 and 2015 (forecasts versus observed data) of European total population (30 countries). Since the RMSE is constant for levels 4 to 7, we choose the \textit{4th} level of decomposition-reconstruction for our forecasts for simplicity.

4. Results

We apply the five-step methodology to each European country among the 30. We identify three tiers depending on the level of forecasted growth of the European Muslim population among the 30 countries, high-growth, medium-growth and low-growth and 3 scenarios, zero-migration, 2017 migration scenario, and mid-point scenario.

4.1 Zero-migration scenario

4.1.1 Tier 1: high-growth Muslim population countries. Among the High-Growth Muslim population countries, 6 of them will reach a majority of Muslim population in the next 200 years, Belgium (in 2175), Bulgaria (in 2160), Cyprus (in 2175), France (in 2165),

<table>
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<tr>
<th>Tier 1: High-growth Muslim population countries</th>
<th>&gt;5%</th>
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<th>&gt;25%</th>
<th>&gt;50%</th>
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<td>2165</td>
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Table I. Zero-migration scenario tier 1, 2 and 3, high-, medium-, low-growth Muslim population countries
Sweden (in 2170) and United Kingdom (in 2195) (Table I). None of the Medium-Growth Muslim population countries will have a majority of Muslim population in the next 200 years, the most will be more than 25 per cent of the population in Italy (in 2220) and Switzerland (in 2200). Low-Growth Muslim population countries will never count more than 10 per cent of Muslim population in the next 200 years.

### 4.2 2017 Migration scenario

Among the High-Growth Muslim population countries, all of them will reach a majority of Muslim population in the next 200 years. None of the Medium-Growth Muslim population countries will have a majority of Muslim population in the next 200 years, the most will be 49 per cent of the population in Spain in 2220 (Table II). Low-Growth Muslim population countries will never count more than 10 per cent of Muslim population in the next 200 years.

### 4.3 Mid-point migration scenario

The mid-point migration scenario data are obtained by averaging the data of the two previous scenarios (Table III). This is the most likely scenario. Among the High-Growth

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Muslim population countries, all of them will reach a majority of Muslim population in the next 200 years. None of the Medium-Growth Muslim population countries will have a majority of Muslim population in the next 200 years, the most will be 49 per cent of the population in Austria and Norway in 2220. Low-Growth Muslim population countries will never count more than 10 per cent of Muslim population in the next 200 years.

4.4 Benchmarking the proportion of European Muslim population per country

We benchmark spectral analysis proportion estimates to the Pew Research Centre (2017) estimates in Table IV (appendix material) for year 2050.

Based on the two-sample t-test for equal group means, means of the 2050 spectral analysis estimates and Pew forecasts are not statistically different for the three scenarios. The benchmarking may confirm the reliability of spectral analysis forecast estimates as long as the benchmark is itself reliable.
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<td>1.5</td>
<td>0.9</td>
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<td>0.2</td>
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<td>0.2</td>
<td>0.7</td>
<td>0.2</td>
<td>0.7</td>
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<td>AVERAGE</td>
<td>6.3</td>
<td>5.8</td>
<td>8.6</td>
<td>8.3</td>
<td>11.0</td>
<td>10.7</td>
<td>11.0</td>
<td>10.7</td>
<td>11.0</td>
<td>10.7</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>6.8</td>
<td>5.7</td>
<td>8.2</td>
<td>6.8</td>
<td>10.0</td>
<td>8.6</td>
<td>10.0</td>
<td>8.6</td>
<td>10.0</td>
<td>8.6</td>
</tr>
</tbody>
</table>

Two-sample t-test for equal group means

H = 0; p = 0.7459; The logical value 0 indicates the null hypothesis is accepted at the default 0.05 significance level. The p-value for the test is high. There is sufficient evidence that the means are equal.

H = 0; p = 0.8637; There is sufficient evidence that the means are equal.

H = 0; p = 0.9016; There is sufficient evidence that the means are equal.
5. Conclusion

This paper presents estimates with spectral analysis of the years European Muslim Population will be majority among 30 European countries. About 5 per cent of Europe’s population is Muslim. Two main factors are responsible of a growing European Muslim population, a higher fertility rate of Muslim population (one child more per woman on average) than other Europeans and a refugee crisis that reached a peak in 2015 with an influx of refugees coming mainly from Muslim countries across the Mediterranean Sea or overland through Southeast Europe. Refugees have come primarily from Syria, Afghanistan, Iraq and Eritrea. 86 per cent of them are Muslims based on the top ten origins of refugees from 2010 to 2016 (Pew Research Centre, 2017). We implement a five-step methodology (Rostan and Rostan, 2018a) based on spectral analysis which involves 1) de-noising and compression of the first-order difference of the population time series of each European country among the 30; 2) wavelet decomposition; 3) Burg extension of approximations and details; 4) wavelet reconstruction and finally 5) forecasting the Muslim population based on three scenarios: 1) a conservative zero-migration scenario; 2) a 2017 migration and a more likely 3) mid-point migration scenario. In the mid-point migration scenario, we identify 13 countries where the Muslim population will be majority between years 2085 and 2215 in order of occurrence: Cyprus (in year 2085), Sweden (2125), France (2135), Greece (2135), Belgium (2140), Bulgaria (2140), Italy (2175), Luxembourg (2175), the UK (2180), Slovenia (2190), Switzerland (2195), Ireland (2200) and Lithuania (2215). The 17 remaining countries will never reach majority in the next 200 years. The growing Muslim population will change the face of Europe socially, politically and economically. Examples of such changes will include proliferation of mosques, prayer calls from loudspeakers, commercialization of halal foods and products, compatible workload and adjustable working hours with Ramadan constraints, new laws in favor of the Muslim population and a growing meddling of foreign governments in European political decisions. At first, anti-Islam political parties may gain support in a xenophobic reaction to the rising contribution of the Muslim population to the life of the European society until the Muslim population be majority. Then negative reactions should fade away. These social, political and economic changes will bring periods of adjustment that would be painful for the European society -some talk of shock of civilizations- and will depend on the degree of openness and tolerance of the communities toward each other and their willingness to build a balanced European society enriched with a diversity of beliefs and cultures.

References


Further reading


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Abusive supervision and moral courage: does moral efficacy matter?
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Abstract

Purpose – The purpose of this paper is to examine the role of both supervisory abuse and moral efficacy in the weakening or strengthening of moral courage. The study also tests how the interaction between both could influence moral courage.

Design/methodology/approach – Cross-sectional data were collected from a sample of public hospital nurses in Egypt and structural equation modeling was used to analyse the data.

Findings – The study findings revealed that abusive supervision is negatively related to moral courage whereas moral efficacy is positively related to courage. Furthermore, moral efficacy moderates the abusive supervision-moral courage relationship in such a way that the negative association between abusive supervision and moral courage is reduced when moral efficacy is high.

Research limitations/implications – Because of the cross-sectional design of the study, inferences regarding causality cannot be made. Furthermore, more research is needed to identify whether the results of this study apply in other contexts.

Practical implications – Organizations should identify abusive supervisors and offer them abuse-prevention training to circumvent their hostile behaviour. Organizations should also try to consider follower moral efficacy when matching supervisors with followers.

Originality/value – The study addresses calls for research on the personal factors that could mitigate the undesirable effects of abusive supervision.

Keywords Egypt, Abusive supervision, Moral courage, Moral efficacy

Paper type Research paper

Introduction

Moral courage is the fortitude to translate moral or ethical intentions into actions in spite of pressures to not to do so (May et al., 2003). It is a “critical factor” in identifying whether individuals will step up and act in accordance with their values and beliefs (Hannah et al., 2011a, 2011b, p. 556). In spite of being viewed as essential to ethical conduct at work, empirical research on moral courage and its antecedents in organizations is rare (Hannah and Avolio, 2010; Hannah et al., 2011a, 2011b; May et al., 2014). Because of this, there is a very limited understanding of the factors that could bolster or undermine moral courage (Hannah et al., 2011a, 2011b). This study seeks to address this issue by examining the role of supervisory abuse, a contextual factor, and moral efficacy, a mental process, in the...
weakening or strengthening of morally courageous responses. The study also tests how the interaction between both could influence moral courage.

Abusive supervision simply refers to a “prolonged emotional or psychological mistreatment of subordinates” (Harvey et al., 2007, p. 265). Moral efficacy, on the other hand, could be defined as individuals’ beliefs that they can handle effectively what is required to achieve moral performance (Hannah and Avolio, 2010). Drawing on behavioural plasticity theory, this study proposes that the negative association between abusive supervision and moral courage will be reduced when moral efficacy is high. Behavioural plasticity theory posits that individuals with high efficacy are less likely to be influenced by external cues (Eden and Aviram, 1993). This means that employees high in moral efficacy are less likely to be negatively affected by their abusive supervisors. Therefore, moral efficacy could act as a buffer to ease the negative consequences of abusive supervision on employees’ moral courage.

The study makes a number of contributions to the literature. First, most of the previous research on the relationship between leadership and ethical outcomes in organizations has mainly focused on positive forms of leadership such as ethical leadership. However, less is known about the role of undesirable leadership behaviours on ethical outcomes (Hannah et al., 2011a, 2011b, 2013). This study seeks to address this issue by examining the relationship between abusive supervision and subordinates moral courage. Second, although moral efficacy is believed to be an “important contributor” to the desire and decision to engage in morally courageous acts (Sekerka and Bagozzi, 2007, p. 137), very little is known empirically about whether individual differences in efficacy beliefs could “contribute to the understanding of moral courage” (Baumert et al., 2013, p. 1055). This study seeks to address this limitation by examining the relationship between moral efficacy and moral courage. Finally, even though prior research has shown the negative consequences of supervisor abuse, not much is known about the personal factors or potential moderators that could mitigate the undesirable effects of this type of supervision (Harvey et al., 2007; Tepper et al., 2017). Identifying such factors or moderators is essential because personal differences may allow some employees to cope with this type of abuse more effectively than others (Tepper, 2000). This study, therefore, seeks to contribute to the literature by testing how moral efficacy interacts with abusive supervision to influence moral courage. As mentioned before, the study proposes that the negative relationship between abusive supervision and moral courage is reduced when employees are high, rather than low, on moral efficacy.

The rest of this paper is structured as follows. First, the direct link between abusive supervision and moral courage is discussed. This is followed by an overview of how moral efficacy could moderate the relationship between both variables. Following the description of the methodology, the results of testing the proposed hypotheses are presented. The final section of the paper discusses the implications of the findings for research and practice.

Abusive supervision and moral courage

Abusive supervision has received considerable attention from scholars in the past decade or so (Priesemuth, 2013). It is defined as an employee’s subjective assessment of the degree to which his or her supervisor engages in the sustained or enduring display of hostile nonverbal and verbal behaviours, apart from physical contact (Tepper, 2000). Abusive supervision includes actions such as rudeness, coercion, public criticism and loud tantrums. Thus, it constitutes “counternormative behaviour” that employees view as inimical, degrading and offensive (Zhang et al., 2014, p. 1157).
Abusive supervision is subjective because the same employee could perceive a supervisor’s behaviour as abusive in one context and nonabusive in another, and because different employees could differ in their assessment of the same supervisor’s behaviour. It is also sustained because the abuse is likely to continue until its target terminates the relationship, or the abuser terminates the relationship, or modifies his or her behaviour. Moreover, abusive supervision is wilful because supervisors engage in abusive behaviour for a reason such as causing harm or hurting others feelings or even eliciting high task performance (Tepper, 2000, 2007).

Research indicates that abusive supervisors’ behaviour usually leads to employee frustration, alienation and feelings of helplessness (Ashforth, 1994). Abusive supervision has also been found to be associated with adverse work attitudes and behaviours, as well as reduced levels of wellbeing (Tepper, 2000; Harvey et al., 2007; Tepper, 2007; Sulea et al., 2013). This study proposes that abusive supervision is more likely to be negatively related to moral courage.

Moral courage is generally viewed as a “critical factor” in promoting ethical behaviour in organizations (Hannah et al., 2011a, 2011b, p. 676). It has been defined as “a prosocial behaviour with high social costs and no (or rare) direct rewards for the actor” (Osswald et al., 2009, p. 150). Moral courage usually involves behaving bravely with the intention of enforcing ethical and societal norms without taking into account an individual’s own social costs (Greitemeyer et al., 2006).

Contrary to other types of courage (e.g. physical courage) which are usually motivated by a desire to save face or gain esteem, moral courage is usually motivated by a moral cause and includes elements such as moral principles, goals and intentions (Hannah and Avolio, 2010; Olsthoorn, 2013). Also, in contrast to other prosocial behaviours (e.g. helping) which are usually associated with positive social consequences such as admiration or praise, moral courage is usually associated with negative social consequences such as being attacked, excluded or insulted (Greitemeyer et al., 2006; Osswald et al., 2009).

Moral courage is believed to be “malleable” and likely to be influenced by contextual factors in the organization such as leadership (Hannah et al., 2013, p. 581). When employees encounter abusive supervision, they usually find it difficult to behave ethically and in a morally courageous way because it would be risky for them to do so. Prior research suggests that individuals fear to confront abusive supervisors because of the asymmetry in power (Tepper et al., 2007; Tepper et al., 2009; Hannah et al., 2013). Subordinates could hardly rise to the ethical or moral challenge made by abusive supervisors because the power gap or difference usually discourages subordinates from directly challenging or opposing such supervisors (Hannah et al., 2013).

An abusive supervisor may demean his subordinates and increase their fear of punishment if they act morally or speak up in favour of their ethical principles (Hannah et al., 2013). Employees, therefore, may withhold morally courageous acts so as to avoid relational deterioration or decay and alleviate their supervisors’ hostile behaviour (Tepper et al., 2007; Tepper et al., 2009). In fact, prior research has shown that employees are more likely to respond to abusive supervisors by engaging in avoidance behaviours so as to reduce the discomfort associated with their hostility (Aquino et al., 2006; Tepper et al., 2007). This is in line with power-dependence theory (Emerson, 1972) which postulates that, in relationships in which there is an imbalance of power, those with less power are constrained in terms of their ability to behave in ways that satisfy their desires, beliefs and self-interests (Tepper et al., 2009).

Furthermore, as suggested by social exchange theory (Cropanzano and Mitchell, 2005), hostile treatment form supervisors is usually associated with unfavourable responses from
subordinates because of the negative reciprocity norm. However, because of the power
differential between supervisors and subordinates, subordinates will seek to restore the
balance of the exchange relationship while also ensuring that their supervisors will not
retaliate (Rafferty and Restubog, 2011). This will more likely be through withholding
prosocial behaviours that enforce ethical norms. Thus, applying both power-dependence
theory and social exchange theory, one of the ways in which an individual is likely to
reciprocate negative treatment from supervisors and at the same time minimize negative
consequences is to hold back or minimize morally courageous acts (Rafferty and Restubog,
2011; Wang and Jiang, 2015). Accordingly, and in line with prior research findings on the
association between supervisory abuse and prosocial behaviours in organizations (Rafferty
and Restubog, 2011; Hannah et al., 2013; Wang and Jiang, 2015), this study proposes that
abusive supervision undermines subordinates moral courage:

\[ \text{H1. Abusive supervision will be negatively related to employees’ moral courage.} \]

**Abusive supervision and moral courage: moral efficacy as a moderator**

Moral efficacy refers to people’s beliefs in their abilities to positively deal with ethical issues
at work and handle hurdles to developing and applying ethical solutions to ethical problems
(May et al., 2014). More simply, it is the “belief that one is capable of acting effectively as a
moral agent” (Schaubroeck et al., 2012, p. 1062). Moral efficacy is a key psychological
determinant of the levels of moral motivation and action (Hannah et al., 2011a, 2011b).

Osswald et al. (2009) argue that before individuals could act with moral courage, they
need to feel competent to act. Moral efficacy is believed to be “one likely foundation for
moral courage” as it usually takes great confidence in a person’s own abilities to defend and
explain courageous moral actions and deal with any resistance to them (May et al., 2014,
p. 71).

Moral efficacy could enhance an individual’s level of perseverance in face of ethical
challenges and difficulties, which would be useful in stimulating a desire to act in a morally
courageous way (Sekerka and Bagozzi, 2007). Moral efficacy also provides individuals with
a sense of perceived control over their actions and their power or ability to perform. This
sense of control helps explain the connection between intentions and behaviours (Hannah
and Avolio, 2010). Accordingly, increased levels of moral efficacy usually increase the
likelihood of individuals converting moral intentions into actions (Schaubroeck et al., 2012).
All this suggests that moral efficacy helps increase moral courage. In support of these
arguments, Lee et al. (2017) found that moral efficacy is positively related to the act of
speaking boldly against unethical issues in organizations. Hence, the following hypothesis is
proposed:

\[ \text{H2. Moral efficacy will be positively related to employees’ moral courage.} \]

Moral efficacy could be viewed as a resource that helps employees effectively cope with
abusive supervision (Zhang et al., 2014). Individuals with high moral efficacy usually view
themselves positively and strongly believe in their ability to handle work practices and
issues that are against established moral standards (Lee et al., 2017). Such employees have a
high degree of self-confidence and are effective in dealing with unfavourable situations and
hardships (Saks and Ashforth, 2000). For these employees, being abused is incompatible
with their capability and competence. Because of their lack of dependence on external cues,
such employees are less likely to take this incompatibility personally and are more likely to
focus on the favourable aspects of their jobs (Zhang et al., 2014). As a result of this,
employees with high moral efficacy are more likely to maintain their commitment to moral
and developmental goals, and behave courageously to enforce ethical norms even when
abused by their supervisors. This is in line with behavioural plasticity theory, which
postulates that individuals with low efficacy are more vulnerable to external factors or
forces than high efficacy individuals (Eden and Aviram, 1993). More specifically, in
organizational settings, high efficacy individuals are more likely to be “behaviourally
plastic” and are less likely to be influenced by their work environment conditions and
organizational characteristics (Saks and Ashforth, 2000, p. 46). Therefore, the negative
influence of abusive supervision on moral courage is more likely to be reduced when
employees are high, rather than low, on moral efficacy:

H3. Moral efficacy will moderate the relationship between abusive supervision and
moral courage such that the negative relationship between abusive supervision
and moral courage will be weakened when followers are high on moral efficacy.

Figure 1 outlines the conceptual model of this study.

Sample and procedure
The study data were collected from a sample of nurses in a large public hospital in Egypt
using a paper and pen questionnaire. To minimize the risk of social desirability bias, the
nurses were contacted directly and the questionnaires were given to them at work on a face-

to-face basis. They were also promised anonymity and confidentiality (Bottomley et al.,
2016).

Out of 350 distributed questionnaires, 204 were given back, producing a response rate of
58.3 per cent. Most of the nurses in the sample were female (93 per cent). More than half of
them (55.4 per cent) were between 20 and 30 in age, 27 per cent were aged between 31 and 40,
and the remainder were above 40. As for length of service, 39 per cent had worked in the
hospital for more than 15 years, 19 per cent had worked for between 10 and 15 years, and the
rest had been working in the hospital for below 10 years.

Measures
The questionnaire was translated from English into Arabic using Brislin’s (1970) back-
translation method and was then pre-tested by three nurses from the participating hospital.
Responses to all questionnaire items were on a seven-point response scale where
1 = strongly disagree and 7 = strongly agree.

Abusive supervision. Eight items developed by Tepper (2000) were used to measure
supervisor abuse. A sample item is “My supervisor puts me down in front of others”. Cronbach’s alpha for this scale was 0.894.
Moral courage. A four item scale developed by May et al. (2014) was used to measure moral courage. An item from this scale is “I would prefer to remain in the background even if a friend is being taunted or talked about unfairly” (reverse coded). Cronbach’s alpha for the moral courage scale was 0.777.

Moral efficacy. Four items from the scale developed by May et al. (2014) were used to assess moral efficacy. An example of an item from this scale is “I am confident in my ability to present information about ethical issues to my colleagues”. Cronbach’s alpha for the moral efficacy measure was 0.720.

Analysis

Structural equation modeling (SEM) with AMOS 24 was used to analyse the data and test the proposed model. The measurement model was first validated and then the structural model was estimated (Anderson and Gerbing, 1988).

Measurement model

Confirmatory factor analysis (CFA) was conducted to assess the reliability and validity of the study variables. The fit of the overall measurement model was good ($\chi^2$ (df = 17) = 38.076, $p < 0.01$; CFI = 0.977, RMSEA = 0.078 and TLI = 0.962). The three variables (i.e. abusive supervision, moral courage and moral efficacy) had high internal consistency where the composite reliability scores for all were greater than 0.80 and the average variance extracted (AVE) scores were more than 0.50 (Fornell and Larcker, 1981). Discriminant validity was also achieved where, as shown in Table I, the square root of the AVE of each variable was greater than the interconstruct correlations (Fornell and Larcker, 1981).

Common method bias

As the data were collected from the same respondents and at the same time, the potential influence of common method bias was also examined. The common method factor approach was used (Chang et al., 2010). This approach involves estimating a measurement model in which indicators are allowed to load on their theoretical construct and a common factor. The fit of this model was very good ($\chi^2$ (df = 9) = 9.557, $p > 0.05$; CFI = 0.999, RMSEA = 0.017 and TLI = 0.998). However, more importantly, the variance extracted by the common factor was 0.324, which is lower than the 0.50 criterion suggested by Fornell and Larcker (1981) as indicative of the presence of a substantive construct. Thus, common method bias did not seem to be an issue in this study.

<table>
<thead>
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<th>Construct</th>
<th>1</th>
<th>2</th>
<th>3</th>
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</thead>
<tbody>
<tr>
<td>1. Abusive supervision</td>
<td>0.869</td>
<td>(0.925)</td>
<td></td>
</tr>
<tr>
<td>2. Moral courage</td>
<td>-0.239</td>
<td>0.852</td>
<td>(0.841)</td>
</tr>
<tr>
<td>3. Moral efficacy</td>
<td>-0.242</td>
<td>0.247</td>
<td>0.851</td>
</tr>
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<td>Mean</td>
<td>2.550</td>
<td>6.038</td>
<td>5.340</td>
</tr>
<tr>
<td>SD</td>
<td>1.360</td>
<td>0.913</td>
<td>1.130</td>
</tr>
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</table>

Notes: Sub-diagonal entries are the latent construct inter-correlations. The first entry on the diagonal is the AVE square root, whereas the second entry (in brackets) is the composite reliability; $^* p < 0.05; ^{**} p < 0.01$
**Structural model and hypotheses**

Little *et al.*’s (2006) residual centring approach was used to test the moderating role of moral efficacy on the relationship between abusive supervision and moral courage because it has more power in detecting interactions than standard multiple regression. The approach involves multiplying together one indicator from each construct (i.e. abusive supervision and moral efficacy) and then regressing the cross-product on all indicators of both constructs and saving the residuals. The procedure is repeated for each cross-product and the residuals are then treated as indicators of the latent interaction term in the structural model. Correlated covariances are estimated between the indicators if the actual cross-product included the same first-order indicator (Little *et al.*, 2006).

Sociodemographic variables such as gender, age and tenure are generally viewed as “important control variables in ethics research” (Zhu *et al.*, 2011, p. 155). Therefore, these variables were used as controls in the structural model. The fit of the structural model was good ($\chi^2$ (df = 132) = 263.783, $p < 0.01$; CFI = 0.957, RMSEA = 0.070 and TLI = 0.944). In this model, the predictor variables explained 24.5 per cent of the variance in moral courage ($R^2 = 0.245$).

As predicted in $H1$, abusive supervision was negatively related with moral courage ($\beta = -0.136$, $p < 0.01$). Also, consistent with $H2$, moral efficacy was positively related with moral courage ($\beta = 0.232$, $p < 0.01$). Finally, the interaction term of abusive supervision and moral efficacy was significant and positive ($\beta = 0.150$, $p < 0.01$). This indicates that, as employees moral efficacy increased, the negative relationship between abusive supervision and moral courage decreased. Therefore, $H3$ was also supported. Figure 2 shows the moderating role of moral efficacy on the relationship between abusive supervision and moral courage.

**Discussion**

There is a very limited understanding of the factors that could bolster or undermine moral courage in organizations. This study sought to address this issue by examining the role of both supervisory abuse and moral efficacy in the weakening or strengthening of moral courage. In line with the proposed hypotheses, the study findings revealed that abusive supervision is negatively related to moral courage whereas moral efficacy is positively related to courage. Furthermore, moral efficacy moderates the abusive supervision-moral courage relationship in such a way that the negative association between abusive supervision and moral courage is reduced when moral efficacy is high.
Theoretical implications

This study made a number of contributions to the literature. First, the study responded to calls for more research on the relationship between undesirable leadership behaviours, such as supervisory abuse, and ethical outcomes, such as moral courage (Hannah et al., 2011a, 2011b, 2013). Consistent with both power-dependence (Emerson, 1972) and social exchange (Cropanzano and Mitchell, 2005) theories, as well as prior research findings on the relationship between supervisory abuse and prosocial behaviours (Rafferty and Restubog, 2011; Hannah et al., 2013; Wang and Jiang, 2015), the study found that abusive supervision is negatively related to moral courage. This confirms that, because of the power difference, subordinates are usually discouraged from challenging abusive supervisors and are more likely to reciprocate their negative treatment by withholding morally courageous acts (Tepper et al., 2007; Tepper et al., 2009; Rafferty and Restubog, 2011; Hannah et al., 2013; Wang and Jiang, 2015). This will help them rebalance the exchange relationship with their supervisors and at the same time avoid relational deterioration with them (Tepper et al., 2007; Tepper et al., 2009; Hannah et al., 2013). The study also addressed calls for more research on the link between moral efficacy and moral courage (Baumert et al., 2013). In line with Lee et al. (2017), who found that moral efficacy is positively related to acting boldly in organizations, the study findings revealed that moral efficacy is positively related to moral courage ($\beta = 0.232$). This confirms that moral efficacy is “one likely foundation for moral courage” and that for individuals to act with moral courage, they need to feel competent to act (May et al., 2014, p. 71). It is worth noting that both abusive supervision and moral efficacy explained a small proportion of the variance in moral courage ($R^2 = 0.057$ for abusive supervision and $R^2 = 0.061$ for moral efficacy). As mentioned before, very little is known about the antecedents of moral courage (Hannah and Avolio, 2010; Hannah et al., 2011a, 2011b; May et al., 2014). However, researchers argue that other factors such as group norms and moral meaningfulness could affect the decision to act in a morally courageous way (Sekerka and Bagozzi, 2007; May et al., 2014). Therefore, future research may wish to consider the relationship between these factors and moral courage.

Finally, this study addressed calls for research on the personal factors that could mitigate the undesirable effects of abusive supervision (Harvey et al., 2007; Tepper et al., 2017). Specifically, the study contributed to the literature by examining the moderating role of moral efficacy on the relationship between abusive supervision and moral courage. The findings revealed that moral efficacy moderates the relationship between abusive supervision and moral courage in such a way that the negative relationship between both variables is weaker for employees with high rather than low levels of moral efficacy. This suggests that moral efficacy is a resource that helps some employees cope with abusive supervision more effectively than others (Zhang et al., 2014). This is also consistent with behavioural plasticity theory and confirms that when employees are high in moral efficacy, they are less likely to be negatively affected by external forces such as supervisory abuse (Eden and Aviram, 1993).

Practical implications

The study findings suggest that supervisory abuse may reduce followers’ courage to translate ethical intentions into actions. Therefore, organizations should avoid hiring managers or supervisors who are disposed to mistreating others and displaying hostile behaviours. They could use integrity tests when hiring supervisors and could include questions related to ethical dilemmas and the treatment of subordinates in the interview process (Mostafa, 2018). Organizations should also identify abusive supervisors and offer them abuse-prevention training to circumvent their hostile behaviour. This is important, especially that the malicious effects of abusive supervision are very costly to organizations (Zhang et al., 2014). Even though
Abusive supervisors are usually not easy to detect (Tepper et al., 2007), practices such as seeking feedback from subordinates or 360-degree appraisals may help identify such supervisors and offer them developmental or disciplinary attention (Hannah et al., 2013).

The study findings also suggest that moral efficacy is important for stimulating moral courage and that the negative influence of abusive supervision on moral courage is more severe for individuals with low moral efficacy. Therefore, organizations should pay more attention to moral efficacy when recruiting and selecting employees. Specifically, they could recruit and select individuals based on their confidence and ability to deal with ethical dilemmas and apply ethical solutions to problems. Organizations should also consider follower moral efficacy when matching supervisors with followers. They also need to identify employees with low moral efficacy, pay special attention to them and ensure that their supervisors do not treat them with abuse and treat them respectfully and fairly (Zhang et al., 2014). Organizations could also promote employees moral efficacy through practices such as mastery experiences, mentoring and social learning (Hannah et al., 2011a, 2011b; Neumeister, 2017).

Limitations
The study has a number of limitations. First, because of the cross-sectional design of the study, inferences regarding causality cannot be made. For example, it is possible that employees with low moral courage might actually view their supervisors as abusive. Longitudinal or experimental research would be very useful in this regard. Second, as all the study data were collected from the same respondents at the same point in time, common method bias might have possibly influenced the study findings. However, it should be noted that finding interaction effects helps rule out common method bias because this type of bias severely deflates interaction terms and cannot account for significant interactions (Siemsen et al., 2010; Podsakoff et al., 2012). Nevertheless, future research can minimize common method bias concerns by collecting data from multiple sources and at different points in time. The final limitation relates to the generalizability of the study findings. The study data were obtained from nurses in a single public hospital in Egypt. Therefore, more research is needed to identify whether the results of this study apply in other contexts.

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This is a review of Dr Glen Laman’s book, *Jamaican Entrepreneurship* published in 2014 in Kingston, Jamaica by Minna Press. This exciting publication of 240 pages explores the characteristics, traits and ideas underlying the success of accomplished Jamaican entrepreneurs. It is indeed a noteworthy contribution as documentation of Jamaican entrepreneurs, in this format, did not exist before.

Dr Laman completed much of the research for this book as part of his doctoral work. It is interesting to note that he first encountered the entrepreneurial world as a young boy when his father operated “Claudette’s Ice Cream Parlour and Restaurant” in Kingston, Jamaica’s capital. As a teenager, he worked in his brothers’ whole foods store, Fruit-O-Rama and bakery supply business on weekends and vacations. He recalls traveling around the island, calling on bakeries and trying to collect on outstanding invoices. Despite an exciting career in the corporate world, he responded to the call of entrepreneurship and opened a restaurant in a shopping mall. He later started a business which imported frozen coconut water, natural juices and other products from Jamaica for distribution to businesses in the USA. The book becomes interesting to read when the author has such an entrepreneurial background.

*Jamaican Entrepreneurship* is a study of 15 entrepreneurs who have succeeded despite operating in an environment of political and economic instability in a country full of bureaucratic and legal hurdles to do business. The book emphasizes that entrepreneurs can contribute to economic development to create jobs and foreign exchange. Furthermore, the book implements that Jamaica, as a small island developing nation, should foster policies which encourage indigenous businesses rather than relying on large multinational companies to develop economy. The author advocates teaching entrepreneurship to foster skills and knowledge needed to start and sustain businesses. In addition to anecdotal information about fifteen successful entrepreneurs, the author analyzes their characteristics and traits. The author suggests that early life experiences, risk taking ability, creating opportunity, perseverance, hard work and working at a young age are some of the factors which contribute to successful entrepreneurs.
Although entrepreneurship is a hot subject to study (thanks to modern age entrepreneurs like Mark Zuckerberg to stimulate interest of younger people) and many popular books are written on the subject, this book stands out as it sheds light on a relatively less reflected area – entrepreneurship in a small, less developed, island economy of Jamaica. The book is a great source to understand, how entrepreneurs made it big in the absence of sound national business policies, large market, raw materials, investment capital and any promise of success.

Introductory chapters clearly summarize the problems and limitations faced by Jamaica being a small island developing states economy. At the same time, the book builds national pride by mentioning many achievements of Jamaicans in and outside of the country. Our international image is that Jamaica is a land of high crime rate; this book has great potential of improving brand Jamaica overseas as it highlights our qualities of being hardworking, ambitious and successful people with a “can do” attitude. This book portrays that Jamaica is not just a beautiful island but we are people with innovative ideas.

The book is informative, well researched and well written; before you know, you would have finished reading it. The book is relevant not just for entrepreneurs but for anyone who wants to be successful in their field. This book inspires you to become the best you can. It is a great reference book for anyone interested in entrepreneurship in Jamaica.

The book starts with basic knowledge on the subject which is easy to understand even for the people who are reading their first book on entrepreneurship. Comprehensive literature review provides you with a good foundation. As a matter of fact, it is a great first book to read on entrepreneurship for people interested in having a glimpse of an entrepreneur’s life. The reader is never left alone and the book builds up gradually.

The book shares interesting perspective about historic and socio-political climate of Jamaica and its linkage with entrepreneurship. Only after reviewing the basic nature of entrepreneurial activity and the social and business context of Jamaica, the writer shares the real world experience of 15 Jamaican entrepreneurs who defied the odds and made themselves successful. The profiles include their life history and how they became successful, in an interesting and engaging way. The writer explains, with clarity, what these entrepreneurs had to go through. These are stories of hard work and determination which make the reader view things differently. The profiles are written so well that they take you to the time when these great entrepreneurs were going through their share of difficulties. As I was immersed in reading this book, it reminded me of what Henry Wadsworth Longfellow said years ago – “The heights by great men reached and kept were not attained by sudden flight, but they, while their companions slept, were toiling upward in the night.”

I find the book analytical, carefully researched, entertaining, inspiring and motivating. This book encourages its readers to rise above their situation and succeed as it promotes entrepreneurial spirit and clearly suggests what it takes to be successful in business. The inspiration you get is to never give up! The writer manages to keep the reader interested and stimulate entrepreneurial outlook. The book is well-organized and clearly written. The style and content of the book is suitable for wider audience. The reader can be students, business people or anyone who is interested in understanding the recipe of success in business or life in general. Examination of 15 successful entrepreneurs not only suggests that all of them had their daunting challenges to overcome but also shows us what they did, how they did it and why they did it.

However, this is not an advanced book on the topic. Still, it is a good read as it highlights the importance of self believe, the passion to never give up, an eye to see an opportunity where others see problems, a personality which never gets discouraged, an attitude to take obstacles as stepping stones to success, importance of focus, clarity of purpose, creativity,
innovativeness, risk taking, proactiveness together with many stories verifying that anything is attainable with hard work.

The book also makes one hopeful that if Jamaican entrepreneurs could direct their energies and efforts internally – Jamaica can experience a big economic boost. The relevant policymakers should also read this book, as they will become more aware of the problems budding entrepreneurs face and suggest policies to ease their difficulties.

This book is a shortcut to maximize your learning about Jamaican entrepreneurs in a limited time and makes you appreciate that success is possible by many different routes. The entrepreneurs faced many difficulties, most of them lacked college education and basic resources but they made their way when there was no way, by giving their all.

The book also opens many avenues for future research for scholars in entrepreneurship and provides us with some tips on entrepreneurship education. The author shared many useful sources which promote entrepreneurial activity in young adults and children from an early age. If you are looking for a book on what makes a successful entrepreneur, do not look any further. This is a wonderful book for anyone interested in entrepreneurship.

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