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Big Data in Co-operatives: Establishment, Growth and Management of Cooperative Societies

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Abstract

The advent of new technologies, means of communications and devices for capturing and storing data has resulted into massive data creation which when accumulated and get big result into big data. Generally, three sources of big data exist: Social Networks (SNs), Traditional Business Systems (TBSs) and Internet of Things (IoTs). SNs provide data from inter alia Twitter, Instagram and Flickr. TBSs produce data such as commercial transactions, stock records and medical records. IoTs forms data generated from sensors that are connected to electronic devices. In addition to these three, there are other sources not much explored and known such as from co-operatives societies. This study focused on activities, responsibilities and roles performed during establishment, growth and management of co-operative societies to see how they create data. A descriptive research design was employed to describe these activities, responsibilities and roles. Findings show that, during establishment of a co-operative society, data created include but not limited to history of the area and its accessibility, bylaws, population and types of economic activities taking place in the area where a co-operative society will be established. During growth, data created include new members, economic activities and profit. Some of the data created during management of the cooperative society are reviewed and approved business and financial plan, determined interest on shares, decisions and financial records. Generally, the creation of these data is dynamic and they are created in large volumes with different speeds, formats and sources.

Keywords: Co-operatives, establishment, growth, management, big data

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INTRODUCTION

The advent of new technologies, means of communications and devices for capturing and storing data has resulted into massive data creation and accumulation. When these data get big and become difficult to handle and analyse by the traditional computing technologies is when we call it a big data (Jaseena and Julie, 2014). Several studies have reported different sources of data. For example the study by Acharjya *et al,* (2016) reported that, there are three primary sources of big data which are Social Networks (SNs), Traditional Business Systems (TBSs) and Internet of Things (IoTs) (Chih-Chieh and Chu-Cheng, 2017). The SNs provide human-sourced data from SNs such Twitter, Instagram, Flickr, Picasa, Facebook and Blogs (Mugdha and Priyanka, 2013). The data which provided by SNs can be videos, internet searches, user-generated maps, text messages, comments and pictures to mention just a few (Diksha *et al*, 2017). The TBSs through offering customers services produces data which are allied to commercial transactions, stock records, e-commerce,

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credit cards and medical records (Nawsher *et al*, (2014). According to Mingmin (2016), IoTs forms a valuable source of big data which includes all data which can be generated from the sensors that are connected to electronic devices. With contemporary technologies and IoTs, data can be sourced from medical devices, vehicular processes, video games, meters, cameras and household appliances to mention just a few.

Big data are not only created by external sources such as SNs, IoTs and TBSs. There are internal sources which are not much explored and known. Example of internal source which create data is government. The government create data through collecting different information such as sources of its income, census and payrolls (Bigomokero, 2016). Almost everything we do in this planet results into data creation. Moreover, all regular and irregular activities of organizations including co-operatives societies crate big data (Scholz, 2017). Big data in co-operative societies involves a huge amount of data whose sources are originated from society's activities though it is not clearly articulated how co-operative societies create big data.

There are several studies by different scholars which reported on how society's activities create big data. The study by World Economic Forum (2012) reported that there are huge amount of data which are created every day due to interaction of people in their societies. The interactions of peoples which create data can be through mobile phones or any other means of interaction. The study by Global Pulse (2012) found out that the inventions in technology and greater affordability of digital devices to societies have headed the societies into creation of big data. According to Radal *et al* (2008), the advances in communications, digital sensors and storage have created huge collections of data which has value to a society as well as to business, science and government. The study by Netapp (2013) reported that the bodies of members of societies creates big data during diagnosis; so members of the societies are among the sources of big data in the field of health care. The co-operative societies are established voluntarily by people to address their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise (ICA, 1995). It has been described by Judith (2012), as an association of autonomous units whose purpose is to conduct jointly some activities as a means of increasing income and reducing cost. Co-operative societies are managed under the co-operative values which are self-help, self-responsibility, democracy, equality and solidarity. Also have ethical values such as honesty, openness, social responsibility and caring for others (TFC, 2006). According to Judith (2012), co-operative society establishment involves steps like feasibility study, meeting with officials of the area, first formation meetings, election of formation committee, registration meetings, preparation of registration documents, waiting for registration and receiving registration documents. In each step, there are responsibilities of members like paying shares and entry fees which creates data. The study added that, in the co-operative growth there are issues like increase in number of members, economic activities, profit as well as amendment of bylaws and trainings to members which actually creates data. In the management of co-operative societies, there are roles of governing organs which also create data.

The presence of these various steps, activities, responsibilities and roles during establishment, growth and management of co-operative societies has attracted the attention of researchers and academicians to explore the way they create data and contribute to big data development. Specifically, this study focused on studying the activities, responsibilities and roles which are carried out during establishment, growth and management of co-operative society to see how they create data.

Conceptual and Theoretical View of Big Data Creation in Co-operatives

Since this paper focused on the activities, responsibilities and roles carried out during establishment, growth and management of co-operative societies to see how they create data which gradually accumulate and contribute to big data development, then the Simplicity and Power (SP) Theory was adopted as a guiding theory. The SP Theory adopted the idea of brain like system that takes in "New" information and stores some or all of it as "Old" information (Gerard, 2019). The main idea behind this study is that co-operative society's establishment, growth and management are dynamic and repetitive; so the data which were created at the first time accumulate as old data and the data which follow are taken as new and get added to the existing data. In a long run, these data accumulate and get big and become a big data. For example, one of the responsibilities of members of the co-operative society is to pay share every month. The first payment is the new data which becomes old data during the second payment. This data get accumulated every month to form big data

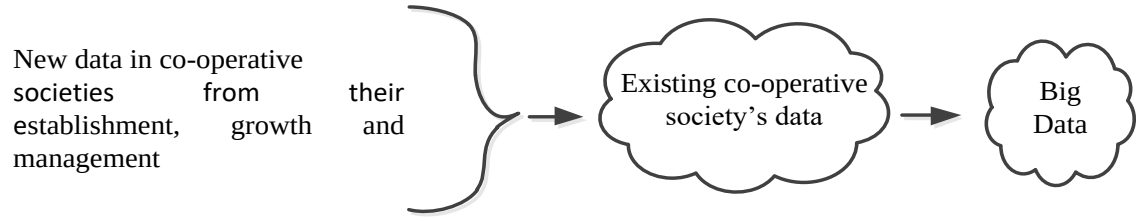

Figure 1: Conceptual view on a how co-operative society creates a big data

From Figure 1, in the growth of a co-operative society, the previous members and economic activities in the society are taken as an old data. When there is an increase in number of members and economic activities, the new members and economic activities are taken as a new data in a co-operative and are added to the existing data to form big data.

METHODS

Study Area: The study involved the co-operative societies which were established worldwide. This was due to the fact that the study aimed at getting the general view on how co-operative societies create big data rather than how co-operative societies of a certain area create big data. The study studied globally the activities, responsibilities and roles carried out during establishment, growth and management of co-operative society. The paper concentrated only in these three stages of co-operative society because it believed that these stages involve a lot of activities which contribute to big data creation.

Research Design and Data Sources: This study employed a descriptive research design which enabled the researcher to describe various steps, activities, responsibilities and roles during establishment, growth and management of co-operative societies. The desktop approach through intensive literature review was used to review the previous research findings and publications on various steps, activities, responsibilities and roles involved in co-operative societies from its establishment, growth and management. The previous findings enabled the researcher to gather facts on how activities involved in the co-operative establishment, growth and management contributes in the data creations.

Limitation and delimitation of Study: The study used secondary data only to explore the data which are produced during establishment, growth and management of co-operative society. The use of secondary data only open a further studies on the same topic by using primary data or both primary

and secondary data. Moreover, the study involved only three stages of co-operative society development which are establishment, growth and management. These stages are believed to involve a lot of activities which in one way or another produce data and contribute to big data development.

FINDINGS AND DISCUSSION

Establishment of Co-operative Societies: Co-operative societies are always established where there are groups of interested people who have a common bond. The common bond can be shared problems, needs, residing in the same location, working in the same place and doing the same activities to mention just a few. As usual, establishment of any society has its own procedures and steps to be followed as well as activities to be carried out to accomplish it. Findings show that a co-operative society has several steps and activities during its establishments. The initial steps (economic survey and meeting with officials of the area in which Co-operative society will be established) and activities are performed by a group of people who intend to form a society while others are performed by the selected committee. Findings show that establishment of the co-operative society creates a lot of data which contribute in big data development. These steps, activities and possible data created during establishment of Co-operative society are shown in Table 1.

Table 1: Data created in establishment of Co-operative society

Steps	Core activities	Possible Data created	References
Economic /feasibility survey	Survey the area on: its history, presence, competitors, literacy level accessibility, population and age, types of economic activities, communication network, financial intermediary	Size of report on: History of the area, Presence of competitors, Accessibility of the area, Age population, Types of economic activities, Communication network, Presence of financial intermediary, Literacy level and income level, perceptions on the need for co-operative	Caltivate coops (2018). Coop Canada (2019), Kevin, (2003), Judith (2012).
Meeting with officials of the area	Explain to officials of the area on: Proposed Co-operative society, its Vision and Mission, Plan for public meeting, roles of local leaders	Size of the explanation on: Vision and Mission of the proposed Co-operative society, plan for public meeting, roles of local leaders	Anubhav (2017) Abigail (2017). Andrew (2006)
First General meeting (Formation meeting)	Educate members on: meaning, advantages, joining procedure, capitalization, and membership, right of members and Management of Co-operative society. Prepare notice for the meeting	Notice for the meeting, education to members on meaning, advantages, joining, capitalization, membership, right of members and management of Co-operative society, selected leaders, agreements, etc	Kevin (2003), Judith (2012) Andrew (2006)
Election of formation committee	To register members, prepare bylaw and year budget, complete feasibility report, appoint secretary/accountant, purchase stationary, rent office, and call for registration	Registered members, Prepared bylaw and year budget, completed feasibility report, appointed secretary/accountant, purchased stationaries, rented office, a call for registration	USDA (2018), Judith (2012) Sarah (2013)

Registration meeting	Receive progress, discus and approve bylaw and year budget.	Received progress, discussed and approved bylaw and year budget.	Anil (2013) Judith (2012)
Preparation of registration documents	To prepare copies of application form, Bylaw, economic survey, first meeting and year budget, attendance list	Size of copies of application form, bylaw, economic survey, first meeting and year budget, attendance list	Sam (2010), Judith (2012) Kimberly and Jamie (2005).
Waiting for registration	Making follow up to registrar, call member's meeting time to time to inform them on progress	Updates from registrar, notice for meeting, raised questions and answers	Judith (2012) Lionel (2000), David et al (2014)
Receiving registration certificate	Beginning full scale operation, acquire legal status, Enter into contracts, own properties, sue/sued, liquidate	Contracts, properties, sue/sued records, liquidated records	Julie (2014), Judith (2012)

As shown in Table 1, there are different data which are created during co-operative society establishment in each stage. Since establishment of co-operative societies is dynamic, and there are different forms of co-operative societies, therefore, the data which are created are of different types, formats and speeds. These findings advocate that big data are not only caused by famous source like sensors and IoTs. Establishment of a co-operative society also contributes in big data development. Moreover, these findings is in line with study done by Janusz (2013) and Maryam (2015) who reported that there are a lot of data which are produced during establishment of organization and businesses.

Growth of Co-operative Societies: Findings show that the growth of a co-operative society creates data which can be accumulate and form big data in a given time. This growth creates data related to increase in members, profit, economic activities as well as amendment of bylaws. The trainings which are offered to members create another source of data. Since creation of these data are dynamic and repetitive, the created data get accumulated and finally form big data. Sources of these data are also different and they vary in speed in which data are created. Table 2 shows the data which are created during developments of co-operative societies. These findings show that as a co-operative society grows, it also increases the amount of data in the field of co-operative.

Table 2: Data created during development of Co-operative society

Indicators of growth	Possible data created	References
Increase in number of members	Number of members, payments on shares, debts, interest rate, personal information, size of the capital	Daman (2004) WorldFood Day (2012)
Increase in economic activity and Increase in profit	Size of the products, profit, investment, infrastructures, stakeholders etc	Paul&Issac (2012)
Amendment of Bylaw, shares, interest rate	Amended bylaw, plan, budget, shares, interest rate e.t.c	Agriterra (2019) Nuredin and Byeong (2015)
Training to members	Size training materials, number of calls for training, used stationaries, number and size of questions, quizzes and answers provided	Ellen&Maertens (2014), Mandal (2013),

The creation of these data are in dynamic mode which means that as co-operative society grow, the data creation also increase. These findings are in line with the studies which conducted by Mohanad and Ahmed (2015) in India on how hospital create big data. In their studies they indicated that, the increase in service offered at hospital and number of patients contribute much in data creation.

Management of the Co-operative societies

Responsibilities of members of a co-operative society: Most of our daily responsibilities result into data creation. Findings show that responsibilities of the members of a co-operative societies result into data creation and contribute towards big data development in Co-operatives. Some of the responsibilities of members of co-operative society which result into data creation include paying membership fees, shares, debts and entry fees to mention just a few. Table 3 contains detailed responsibilities of members and possible data to be created. These responsibilities are dynamic to members throughout their life in a co-operative society. So, data creation is also dynamic throughout.

Table 3: Responsibilities of members and possible data created by each responsibility

Responsibilities of Members	Possible Data created	References
Pay the membership fee, shares, debts and entry fees	Payments of membership fees, shares, debts and entry fees	Greg (2011), Westerncape (2004),
Amend and approve bylaws, budget and financial and business plan, policies, contracts, action plans	The size of amended and approved bylaws, budget, financial plan, policies, contracts and action plans	Caltivate Coops (2018). Nuredin and Byeong (2015)
Elect and remove leaders, vote at annual meetings, attending meetings, making decisions, asking questions	Elected and removed leaders, voting, questions asked, answers, decisions made, attendance	USDA (2018), George and Gert (2018).
Taking care of asset of the Co-operative, being loyal to society, participate in economic activities, Patronize the Co-operative, Maintaining the Co-operative	Any support to society, New members, Taking suggestions and criticism to the board or to membership meetings, rather than airing them on the street corners,	Lionel (2000), David (2018), Judith (2012)

As it is shown in Table 3, each responsibility creates different data from another. The speed of data creation also differs from responsibility to responsibility. As time goes, these created data accumulate and get big. The study by Gopalakrishna and Geoffrey (2014) also argued that the daily responsibility of workers like bankers also create data which in long run forms big data. The accumulated data acquire the characteristics of volume, since they increase in volume; velocity, since they are created in different speed; veracity, since the data are from different sources; variety, since the produced data are in different formats and value, since the created data need to be analysed so as to be useful.

Roles of governing organs (Board and Staffs): The roles of governing organs in co-operatives create a lot of data which in a long run result into big data. The roles of these organs can vary depending on a type of co-operative society and decisions of the members. Table 4 shows the governing organs and their roles as well as possible data they can create during accomplishment of their roles.

Table 4: Roles of Governing organs and Data they create

Organs	Roles	Possible Data created	References
Board Members	Define: Mission &Vision, Review and approve the business and financial plan, Mobilize resources, Determine interest on shares, Draw short and long term plan, employ staff, register members, keeping financial records, prepare financial plan, making major decision, monitor the work of society, enter contract	Detailed Mission and Vision, Reviewed and approved business and financial plan, Mobilized resources, Determined interest on shares, Drawn short and long plan, employed staff, registered members, financial records, prepared financial plan, decisions made, number and type of contract entered	Judith (2012), Kathryn (1986) DIY (2016),
Finance and planning committee	Prepare budget and uses of fund, Identify financial resources	Prepared budget, used fund, identified financial resources	Dogarawa and Ahmadu (2005).
Credit Committee	Examine credit application, Approve application, follow up borrows, report to board members	Examined credit application, Approved application, follow up made to borrowers, reports to board members, amount of loan, overdue loan, bad loans, number of defaults etc	Judith (2012), Coopuk (2016),
Manager	Set targets, Manage the: works, external relations, information and communication, finance, and material resources. Encourage teamwork, Decision making	Targets set, amount of managed works, external relations, information and communication, finance, and material resources. Encouraged teamwork and decision made	Daman (2004) USDA (2015), Katara & Vishwa (1994). Westerncape (2004)
Chairperson and Vice Chairperson	Plan and run meeting, ensures that decision are made when required, dealings with opinion and conflict and ensuring that government set and stick to their policies.	Number of planned and conducted meetings, decisions made, number of worked opinions and conflicts solved. Implemented policies,	DIY (2016), OCES (2011),
Accountant	Keep financial record, Receive payment, Prepare financial statement	Financial records, Payments, Financial statements, purchased made	Judith (2012), Kifle (2015)
Secretary	Write minutes of the meeting, assisting the Chairperson, Take care of the properties of the Co-operative.	Written meeting notes, task assisted to Chairperson, type and amount of properties protected.	Coopuk (2016). Advocatekhoj (2008)

As indicated in Table 4, roles of these organs create different data. Since these organs are working daily, and the data get created daily, they become big as they accumulate. In a long run, it is possible to have big data which are created from different co-operative organs, with different speed and formats. Generally, these findings show the contribution of governing organs in big data development. It shows how daily activities and roles of governing organs create big data. These findings are supported by report of Travis and Rasmus (2013) in their study they reported that roles of researcher which including developing sensors for IoTs creates a lot of data. The data which created by

sensors which are developed for research purpose grow and form a big data.

CONCLUSION

This study has focused on various activities, roles and responsibilities which are carried out during the establishment, growth and management of co-operatives to find out how they contribute to big data development. Findings show that all these three stages are contributing much in big data development. The study was trigged by the presence of various activities, roles and responsibilities during establishment, growth and management of a co-operative society. Specifically, the study found out that, in establishment of co-operative societies, there are a lot of activities which create data both qualitative and quantitative. These activities are those which take place in all steps of society establishment such as economic survey, meeting with officials of the area in which a co-operative society will be established, first formation meeting, elections of formation committee, registration meeting, preparation of the registration document, waiting for registration and receiving registration certificate. These activities are different and they produce different data in different speeds and formats. During Co-operative growth, the activities which create data include but not limited to increase in number of members, economic activities and profit. The amendment of bylaw also create data and contribute in big data development. The findings also show that the daily responsibilities of the members of co-operative society produce a lot of data which final contribute into big data development. These responsibilities include paying shares, debts and entry fees. Other responsibilities are amended bylaw, approve financial plans and budget, elect leaders and all mechanisms towards protecting the image of the society. Taking care of the assets of the co-operative society and all events related to being loyal to the society like participating in economic activities are also among the responsibilities of members.

Also, it was found that the roles of the organs of the governing body are among the key sources of data in co-operative society management. It was found out that, the roles of organs like board members, finance and planning committee, credit committee, manager, chairperson, vice chairperson, accountant and secretary produce a lot of data which in long run accumulate and get big in size. Examples of the data they create include Mission and Vision, reviewed and approved business and financial plan, mobilized resources, determined interest on shares, drawn short and long plan, employed staff, registered members, decisions, financial records and plan to mention just a few. Generally, the study found out that establishment, growth and management of a co-operative society produce a lot of data in the field of co-operatives. The data produced acquire the characteristics of big data which are volume, velocity, veracity, variety and value. This is due to fact that the establishment, growth and management of a co-operative society are dynamic; so data are created every day in large quantity with different speed, formats and sources. Also as these data get big, they can't be used without analysis.

Recommendation and Study Significance

Based on the results obtained, we recommend further studies on the same topic by using primary data or both primary and secondary data. This is due to fact that this study used only secondary data. The output of this proposed further study will fill the gap which exist in this topic. On other hand, this study had contributed much theoretically and empirically in the body of knowledge within the field of big data specifically on contribution of co-operative societies in big data development. To academia, the study had contributed on stock of body of knowledge and literatures on steps involved in establishment of co-operative society and

data which each step create, activities involved in establishment of co-operative society and data which each activity create as well as responsibilities of members, activities which take place and data they produce during development of co-operative societies. Another contributions are on governing organs of co-operative society, their roles and data they produce during management of co-operative societies. Moreover, the study raised awareness to the general public on how co-operative society create big data.

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