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Impact of Policy Changes on Agricultural Research and Development

Agriculture is the prime service sector which provides food for mankind on Earth. This sector is more dynamic and shows significant improvement through research, decade by decade, to feed the growing global population. Agricultural policy reforms and revisions are needed to have a healthier agriculture sector of a country. However, making very frequent changes in agricultural policies will also leave the country in an unsteady state to progress with the sustainable food production. In developing countries, very frequently, making attractive agricultural policy is a common practice to attract the farming community for various purposes. Meanwhile, the new technological innovations available in the market are the outcome of hard work of researches for years and years. Therefore, these kinds of long term, continued, innovation researches could be severely affected by the sudden and frequent changes in agricultural policies.

During last six decades, Sri Lankan agricultural researches (mainly through the Department of Agriculture) have contributed significantly for the development of agricultural sector on various crops. There are evidences for varietal developments of several crops such as paddy, field crops, fruits & vegetables. This journey on green revolution had begun with the release of H4 variety of paddy in 1958 which was the research outcome of the several years of hard work. Release of a variety for high productivity is the prime objective of the technological innovations in agriculture. Certainly these innovations are coupled with the other important management packages such as fertilization, irrigation, weed control and pest & disease management. These management combinations are inevitably anticipated with the aim of increasing the productivity of any crop variety by a breeder. During this innovation pathway, if any of the said management packages are blocked or interrupted, then the research need to be continued with the substitutes which inevitably forces to pull back the whole process of the initial research findings.

Based on the need, introduction of organic form of plant nutrients and pest & disease management have already began almost a decade ago. However, most of the researchers have started with testing different combinations of inorganic and organic ingredients in a hybrid mode at different growth stage of the crops. This process may take another 5-10 years period to come up with a good management package for the integrated approach.

One of the other impacts with the policy changes could be the reduction on the overall agricultural production which may lead to increase the need for importation various agricultural products. This fact could be clearly reiterated by considering the present situation on vegetable seed supply in the country. The supply of good quality seeds is the main contribution to have high production on a sustainable basis. In vegetable production, almost 80% of the seeds are supplied through importation and at present, almost all the imported varieties are hybrids. All these imported vegetable crop varieties are bred along with other management packages such as fertilizer and pest & disease management which are primarily based on inorganic ingredients (chemical). This phenomenon is not exceptional to varieties bred locally.

Therefore, for example, sudden policy changes on banning import of agrochemicals will anticipate remarkable repercussions on food security of the country in near future.

Prof. T. Sivananthawerl

Department of Crop Science

Faculty of Agriculture

University of Peradeniya

Leading Article

Impact of COVID-19 pandemic on children

Sathiadas M G

Department of Paediatrics, Faculty of Medicine, University of Jaffna, Sri Lanka

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Abstract

Impact of Covid-19 on children is immense affecting not only their health but their education and safety. The long-term effects of this pandemic are unknown but short-term outcomes are clear. Even though the disease per se is affecting children mildly the effect of periodic lockdown and school closure has led to issues in their learning. Children are learning remotely through the electronic devices hence it hinders their physical activity and social interaction. Being at home, snacking all the time and having access to mobile phones with less physical activity has led to childhood obesity. At the same time, children belonging to poor socio-economic status have undernutrition due to food security issues. Children with special needs and special education are affected more as the services have seized due to the pandemic. Parents of these children are not familiar in caring for these children hence their underlying condition can get exacerbated. High level of stress, unemployment, social isolation has led stress in the family and promoted violence towards children. Help seeking and lack of

access to services have contributed to child safety issues as well.

We need to prioritize and reopen schools in a graded manner with proper health and safety. Remote system of education is advocated which involves children with special needs as well.

Keywords: Children, Covid-19, Pandemic.

1 Introduction

Children throughout the world are affected by the COVID-19 pandemic. The impact of the pandemic is not only affecting their health but their education, mental and social wellbeing as well. Their lives are being forced to change in profound ways. The socioeconomic impact of the disease will have more detrimental effects on their future as well.

The effect of the pandemic is having a profound effect on the poorer countries and especially those who are already disadvantaged and living in overcrowded poor neighbourhoods. Sri Lanka being a low middle-income country faces numerous problems due to the pandemic (UNICEF, 2021a).

Corresponding author: Prof. M. G. Sathiadas, Professor in Paediatrics, Department of Paediatrics, Faculty of Medicine, Jaffna. e-mail: docsathiadas@hotmail.com



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2 The Disease

Majority of the children with COVID-19 experience mild symptoms or are asymptomatic. According to global data when compared to adult's death in children and the number of children who are symptomatic and testing positive is very low. Very rarely some children can get severe disease which might require hospitalization, intensive care, or a ventilator support. A rare but serious condition with COVID-19 called Multisystem Inflammatory Syndrome in Children (MIS-C) has been reported worldwide and few cases have been reported in Sri Lanka as well (Munblit *et al.*, 2021).

Children experiencing severe disease or needing hospitalization are mainly under one year and those with a co-morbid condition such as asthma, chronic lung disease, diabetes, heart disease and immunosuppression. Symptoms of COVID-19 are similar in adults and children can mimic common illnesses such as colds, sore throat, or allergies. Fever and cough are the most common symptoms of COVID-19 in children (CDC, 2019).

Children are at highest risk in many infectious diseases, but the opposite is seen with COVID-19 where children are at low risk. In most of the developed countries deaths due to COVID-19 in children remained rare up to February 2021, at 0.17 per 100 000 population. Mortality from COVID-19 was relatively high in older children compared to the younger children (Bhopal *et al.*, 2021).

In addition to the disease mortality there are other issues that need analysis during this COVID-19 pandemic in children.

3 Hospitalisation due to other diseases

Parents of children may be avoiding medical care due to fear of acquiring the covid-19 in the hospital itself. We at the Teaching Hospital, Jaffna compared admission rates for acute paediatric conditions during the COVID-19 pandemic with a reference year. During the pandemic period, there was a 58% reduction in admission rates for all conditions combined in 2020 compared with 2019 which was 9.3% ($X^2=136.5$, $P<0.001$) (Sathiadas & Devapriya, 2020). The Daily admission rates during the COVID-19 pandemic was low as in all paediatric medical conditions.

Considering the chronic diseases such as bronchial asthma, seizure disorder, malnutrition, renal and liver diseases too failed to attend their regular clinics during the pandemic especially during the lockdown period. This must be alleviated by clear public health campaigns and insisting on the regular clinic visits and taking regular medications (Rosenbaum, 2020).

4 Routine vaccination.

According to the UNICEF report nearly 14 million children missed their routine vaccination in the year 2019 and under vaccinated children is expected to increase worldwide exacerbating the existing inequalities (UNICEF, 2021a). Sri Lanka took

steps to issue missed routine vaccinations to children during pandemic and as a country this was achieved successfully even after a brief period of delay in the vaccination.

According to the current policy on covid-19 vaccination is not recommended but it may change with the changing course of the disease and discoveries (UNICEF, 2021a).

5 Children with special needs

Children who are developmentally challenged face numerous problems due to the COVID-19 pandemic and lockdown especially in their educational, vocational activities, leisure activities, and access to health services especially to behavioural health services. Children with autism spectrum disorder predictability and routine are the key issues and that comfort is disrupted during the pandemic. This as well as inability to access the routine care is a struggle to maintain normalcy in these children. Children who rely on a routine structured environment in school and having a familiar schedule enhanced through 1:1 instruction are now being expected to perform in their homes in front of a tablet or laptop. Parents may gain a great insight into their children's strengths and needs but they may not have the required training and experience to effectively manage the education plans. This is further hindered by their working from home arrangement, care of other household members and household chores (Baweja *et al.*, 2021).

Parental support is needed for children who use alternative communication, such as gestures or picture exchange and virtual interaction. Effective reinforcement strategies must be adopted to develop a realistic and sustainable schedule in learning which will be an immense task for the parents (Baweja *et al.*, 2021). This has been overcome in many countries as well as in Sri Lanka by providing telehealth services. Web based provision of behavioural health services through telehealth, telemedicine, teletherapy and telepsychiatry is advocated in many countries and has shown effectiveness (Ramirez *et al.*, 2021).

6 Education during Pandemic

Nearly 168 million children globally have been affected by school closure due to COVID-19 and lockdowns. Furthermore, nearly 214 million children globally i.e., one in seven have missed nearly 80% of the in-person learning (UNICEF, 2021a).

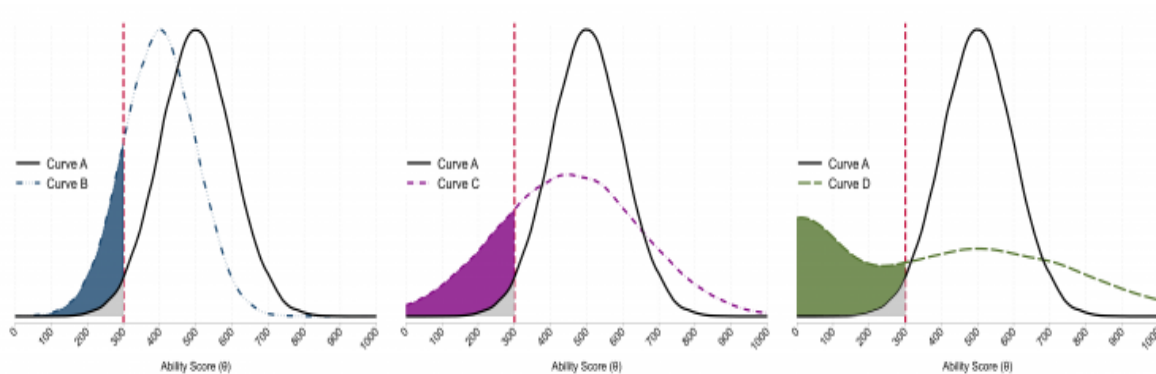
The pandemic has exaggerated the inequities affecting schoolchildren in poorer countries to a greater extent. Lack of resources to invest in digital learning and the absence of household internet access is seen in poorer households. According to the "After Access Asia report 2019" only 34% of the Sri Lankan households have access to a device with online learning. In poorer areas this number dropped to nearly 21% (Galpaya *et al.*, 2019).

Despite the remote learning policies and the presence of the necessary technology at home,

the skill gap of the children, teachers and the parents also will hinder the learning.

Examinations that are needed for admission and advancement to new educational levels are affected by the closure of schools. Variable access to learning and conducting exams through a distance process has serious concerns about fairness (Lucas, 2020).

Not only did the children miss their educational needs but also the social interaction and extracurricular activities. The technical and vocational training is affected by the disruptions in workplace-based apprenticeship schemes and work-based learning.



UN Policy brief on Education 2020

Figure 1: *Three possible scenarios of how the learning curve may evolve in the coming months: a lower average, a higher standard deviation, or a sharp increase in low learning at the bottom*

Greater loss in learning is seen both in short and long term. According to researchers in Canada socio-economic skills gap can increase by 30 per cent due to the pandemic. The World Bank identifies three possible scenarios for the loss of learning (*Figure 1*): a reduction in average learning levels, a widening of the distribution of learning achievements, or a significant increase of students with very low level of achievement due to dropouts (United Nations, 2020).

Provision of essential services through schools and communities are affected by school closure. The loss of school meals and other health and nutrition services affected nearly

370 million children in 195 countries during the first few months of the pandemic (World Food Programme, 2020).

The prolonged period of school closure will lead to more children to drop out of school as the economic crisis on the family will put pressure on the children to work and generate income for financially struggling families. (United Nations, 2020).

7 Impact on the Nutrition

A Humanitarian crisis is anticipated during and after this pandemic especially in children who are undernutrition. Under nutrition has an increased risk of infection and children are

depended on adult for food. Children will suffer when the caregivers become sick, quarantined, or unable to secure nutritious and safe food and drinking water. As many as 132 million people may have gone hungry in 2020, of that 44 million are children and nearly 370 million children may have missed nutritious school meals (UNICEF, 2021a). Deteriorating quality of food, disrupting food systems, affecting health and nutrition services, devastating livelihoods, and threatening food security are contributing to the malnutrition in children during the pandemic. Wasting and acute under nutrition seen as short term and stunting as long-term problems is predicted to increase in the near future.

Scaling up and intensifying existing nutrition related programmes, empowering women, and providing safe food can help to overcome this problem (Bahatheg, 2021).

In addition to undernutrition the prevalence of childhood obesity is also increasing contributing to the double burden. Children at home with access to social media and discussing issues related to food preparation are associated with weight gain (Yılmaz & Gökmen, 2020). Stay-at-home orders has increased screen time and cooking at home. Screen time is associated with overweight in childhood especially when it is associated with snacking. Hearing or reading about COVID-19 can be stressful and this can make children to eat “comfort foods” that are rich in sugar and fat (Rundle *et al.*, 2020).

8 Child Protection Issues

There are several reports to say that Violence against children has increased due to the COVID-19 pandemic. In addition, there is disruption of the child protection services. High level of tension in the household due to economic uncertainty, job loss or disruption to livelihoods, and social isolation are well known risk factors for violence at home.

Children may also witness intimate partner violence during this period. Identifying children at risk is a challenge as signs of abuse are usually picked by teachers, extended family and community members who are no longer in regular contact with children.

Nearly 1.8 billion children living in the 104 countries have experienced a disruption to child protection services. In addition to sexual and physical abuse the children also face the risk of child labour due to the economic burden the family faces (UNICEF, 2021b).

School closures have led to an increase in child marriages in the past which often prevent children from continuing their education. The disruption of provision of the reproductive health services has a direct impact on teenage pregnancy as well.

9 Mental health

Uncertain situation, isolation and parental anxiety have an impact on mental health of children and adolescents. Children too can worry about the consequences of COVID-19 especially in regard to meeting their friends

and relatives, going to school or getting sick. The increased stress levels are also seen due to exposure of the virus and needing isolation in treatment units or home-based quarantine. Quarantine measures are frightening the children especially if they do not understand what is happening (Wagner, 2020).

Access to mental health services especially children and parents/caregivers with pre-existing mental health conditions is affected during the pandemic. Lack of peer interaction and not able to share their stress with friends makes the situation even worse.

Loss of a loved one to the diseases has a strong impact on the mental wellbeing of the child. According to the latest data each COVID-19 death leaves 0.078 children aged 0 to 17 parentally bereaved. Children who have lost a loved one will need targeted support to overcome the grief. This is difficult particularly during this period of heightened social isolation. Children need psychological intervention on short- and long-term basis (Kidman *et al.*, 2021).

To overcome the mental health issues the National Alliance of Mental Health has stressed the concept of self-care which should be practiced daily. Trauma focused cognitive behavioral therapy has proven to be beneficial in children who have mental health issues related to COVID-19 (Cohen *et al.*, 2017).

10 Screen time during the Pandemic

According to the World health Organization (WHO) the current recommendations for screen time is two hours and physical activity is one hour for older children. Sedentary screen time is not recommended for 1-year-olds, and it should be not more than one hour in those aged 2 years and above (WHO, 2019).

A restricted state of movement has led to recognize the internet and the screen as critical tools for children to access it for learning, playing and entertainment and for social interactions. Spending time on the screens has become a normalcy and part of their life. More attention should be paid to what children do online and the content they encounter in general rather than looking at the time they spend on the screen (Kovacs *et al.*, 2021).

Screen-time has also been blamed for physical inactivity which contributes to childhood obesity. Scheduling the activities so that children do spend time outdoors as well as allowing them the required screen time must be practiced. A promising intervention is to follow a daily school schedule and organise the remaining time on physical and outdoor activity.

11 Conclusion

Impact of COVID-19 disproportionately affects children in poverty especially in nutritional, physical, and mental health needs. Thus, we must prioritize safe and equitable plans for school reopening and advocate for a remote

system of education which also supports children with disabilities. The need to expand nutrition programs and advocate to provide

access to vital school-based resources so that children can be protected during this dark period.

References

- Bahatbeg, R. O. (2021). Young Children's Nutrition During the COVID-19 Pandemic Lockdown: A Comparative Study. *Early Childhood Education Journal*, 49, 915–923. doi:10.1007/s10643-021-01192-3
- Baweja, R., Brown, S. L., Edwards, E. M., & Michael, J. M. (2021). COVID-19 Pandemic and Impact on Patients with Autism Spectrum Disorder. *Journal of Autism and Developmental Disorders*, 52(1), 473–482. doi:10.1007/s10803-021-04950-9
- Bhopal, S. S., Bagaria, J., Olabi, B., & Bhopal, R. (2021). Children and young people remain at low risk of COVID-19 mortality. *The Lancet Child & Adolescent Health*, 05(05), E12–E13. doi:10.1016/S2352-4642(21)00066-3
- CDC. (2019). *CDC guidelines on Covid -19 in children and teens*. Retrieved June 17, 2021, from <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-copingchildren/symptoms.html>.
- Cohen, J. A., Mannerino, A. P., & Deblinger, E. (2017). *Treating Trauma and Traumatic Grief in Children and Adolescents* (2nd ed.). New York: Guild Press.
- Galpaya, H., Zainudeen, A., & Amarasinghe, T. (2019). *After Access-Asia-Report 3.0*. LIRNEasia. Retrieved June 30, 2021, from <https://lirneasia.net/2019/05/afteraccess-asia-report3/>.
- Kidman, R., Margolis, R., Smith-Greenaway, E., & Verdery, A. M. (2021). Estimates and Projections of COVID-19 and Parental Death in the US. *JAMA Pediatrics*, 175(7), 745–746. doi:doi:10.1001/jamapediatrics.
- Kovacs, V. A., Starc, G., Brandes, M., Kaj, M., Blagus, R., Leskošek, B., . . . Brzezinski, M. (2021). Physical activity screen time and the COVID-19 school closures in Europe – An observational study in 10 countries. *European Journal of Sport Science*, 1–10. doi:DOI: 10.1080/17461391.2021.1897166
- Lucas, G. N. (2020). COVID-19 pandemic and school education. *Sri Lanka Journal of Child Health*, 49(3), 207– 209. Retrieved 2020, from <http://dx.doi.org/10.4038/sljch.v49i3.9135>
- Munblit, D., Simpson, F., Mabbitt, J., Galvin, A. D., Semple, G., & Warner, J. O. (2021). Legacy of COVID-19 infection in children: long-COVID will have a lifelong health/economic impact. *Archives of Disease in Childhood*. doi:10.1136/archdischild-2021-321882
- Ramirez, A. V., Ojeaga, M., Espinoza, V., Hensler, B., & Honrubia, V. (2021). Telemedicine in minority and socioeconomically disadvantaged communities amidst COVID-19 pandemic. *Otolaryngology Head and Neck Surgery*, 164(1), 91–92. Retrieved from <https://doi.org/10.1177/0194599820947667>
- Rosenbaum, L. (2020). The untold toll—the pandemic's effects on patients without Covid-19. *The New England Journal of Medicine*, 382(24), 2368–2371. doi:10.1056/NEJMms2009984
- Rundle, A. G., Park, Y., Herbstman, J. B., Kinsey, E. W., & Wang, Y. C. (2020). COVID-19-related school closings and risk of weight gain among children. *Obesity (Silver Spring)*, 28(6), 1008–1009. Retrieved 2020, from <https://doi.org/10.1002/oby.22813>
- Sathiadas, M., & Devapriya, K. M. (2020). Paediatric Hospital admissions during Covid 19 pandemic - A single centre study. *Proceedings of the Annual scientific sessions of the Jaffna Medical Association* (p. 70). Jaffna: The Jaffna Medical Association.

- UNICEF. (2021a). *COVID-19 and children*. Retrieved June 20, 2021, from UNICEF data hub.: <https://data.unicef.org/covid-19-and-children>.
- UNICEF. (2021b). *Child protection and COVID-19*. Retrieved June 20, 2021, from <https://data.unicef.org/topic/child-protection/covid-19>
- United Nations. (2020). *United Nations Policy brief on Education during covid -19 and beyond August 2020*. Retrieved June 27, 2021, from https://www.un.org/development/desa/dspd/wpcontent/uploads/sites/22/2020/08/sg_policy_brief_covid-19_and_education_.
- Wagner, K. D. (2020). *New Findings About Children's Mental Health During COVID-19*. Retrieved June 27, 2021, from <https://www.psychiatrictimes.com/view/new-findings-children-mental-health-covid-19>
- WHO. (2019). *Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age*. Retrieved from World Health Organization: <https://apps.who.int/iris/handle/10665/311664>
- World Food Programme. (2020). *Global Monitoring of School Meals During COVID-19 School Closures*. Retrieved from https://cdn.wfp.org/2020/school-feeding-map/?_ga=2.215701278.825170677.1587840528-1202927441.1587480127
- Yılmaz, C., & Gökmen, V. (2020). Neuroactive compounds in foods: Occurrence, mechanism and potential health effects. *Food Research International*, 128. doi:10.1016/j.foodres.2019.108744

Research Article

Gross morphology analysis for the discrimination of sibling species of the *Phlebotomus (Euphlebotomus) argentipes* sensu lato species complex

Sharmintha, P., Gajapathy, K. and Surendran, S.N.

Department of Zoology, Faculty of Science, University of Jaffna, Sri Lanka.

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Abstract

Leishmaniasis, a zoonotic disease, is a global health threat and the impact of the disease in Sri Lanka is also felt. Though the disease has been known in the country for decades, it was neglected for long and very few studies were carried out about the vectors; sandflies. The potential vector for the disease; *Phlebotomus (Euphlebotomus) argentipes* exists as a species complex. There are only a handful of studies focused on the discrimination of the sibling species based on a complete morphology analysis. The current study aims to reveal the status of morphospecies found in the potential vector species; *Phlebotomus (Euphlebotomus) argentipes* sensu lato species complex using gross morphological analysis. The whole morphometric and meristic characters were recorded from the sandflies collected from various locations in Sri Lanka. They were analyzed statistically to discriminate the sibling species. The study revealed that more than three morphospecies shall be classified based on various morphological features. The

features which can be used in the sibling species discrimination are also illustrated.

Keywords: *Phlebotomus argentipes*; Leishmaniasis; Sri Lanka; Gross Morphology; Morphospecies.

1 Introduction

Leishmaniasis affects poor people, especially in tropical and warm temperate regions such as parts of Asia, Southern Europe, America, and Africa (Ilango, 2011b). There are three main types of leishmaniasis reported so far (Tapia, 2014), namely, visceral leishmaniasis (VL), cutaneous leishmaniasis (CL), and mucocutaneous leishmaniasis (MCL). Visceral leishmaniasis is also called as Kala-Azar. This is the most dangerous and fatal form of the disease, if left untreated. VL affects internal organs such as spleen and liver. There is another condition known as post-kala-azar dermal leishmaniasis (PKDL) which may arise six months or more after an apparent cure from VL. The major symptom of PKDL is skin

Corresponding author: Dr.K.Gajapathy, Department of Zoology, Faculty of Science, University of Jaffna, Sri Lanka.
e-mail: gayan156@gmail.com, gajapathyk@univ.jfn.ac.lk



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rashes. PKDL is reported from parts of East Africa and the Indian subcontinent.

Generally, the disease is known to be linked with environmental changes, such as urbanization, civil construction, and deforestation. Immune deficiency, nutrient deficiency and poor housing (Kariyawasam *et al.*, 2015). Domestic sanitary conditions; such as, open sewerage and lack of waste management, poverty, lack of education, sleeping outside without proper protection, outdoor occupational exposure and displacement are some risk factors associated with the disease.

According to the epidemiological report in Sri Lanka, there are 5 risk factors identified in the transmission of leishmaniasis in Sri Lanka; such as, socioeconomic conditions, malnutrition, population mobility, environmental changes, and climate changes (Shemshad *et al.*, 2013). Moreover, the immune-suppressed people who have immunology disorders or Acquired Immune Deficiency Syndrome (AIDS) are more prone to get leishmaniasis than the others and are at higher risk of developing complications that affect efficient treatment (Ababa, 2007).

The disease is caused by *Leishmania* sp. through sandfly vectors and reservoirs hosts; such as human, cattle, dogs, and rodents. Thus leishmaniasis can also be classified as zoonotic or anthroponotic, according to whether the natural reservoir of the parasite is animal or human (Thakur, 2006). The primary reservoir

hosts of *Leishmania* sp. are sylvatic mammals; such as, forest rodents and wild canids. Two dogs have been infected with amastigotes of *Leishmania* sp. in Sri Lanka (Navaratna *et al.*, 2007). But the studies are not comprehensive to incriminate them as reservoirs. More comprehensive studies are needed as evidence to incriminate any reservoir hosts' involvement in the country (Navaratna *et al.*, 2007).

Phlebotomus (Euphlebotomus) argentipes is the potential vector for leishmaniasis in Sri Lanka and this species occurs as a species complex (Ilango, 2000) (Gajapathy *et al.*, 2011). Therefore, it is crucial to differentiate the sibling species in order to find out the exact vector among species complex. According to (Ilango, 2000), there were two morphospecies identified in the species complex. This classification was based on the ratios of the lengths of second sensilla chaetica and second antennal flagellomere. Thus, a fly with this ratio of 50% or more was identified as morphospecies A and less than 50% was identified as morphospecies B (Ilango, 2000). However, the classification was reassessed again (Ilango, 2010). The morphospecies B was classified further into two species, with three species being reported (Ilango, 2010). Apart from the length ratios of second sensilla chaetica and second antennal flagellomere, overlap of wing, wing index, and the pattern of pharyngeal teeth were also used to differentiate the species complex (Ilango,

2010). The current study was designed to differentiate the sibling species from *Phlebotomus (Euphlebotomus) argentipes* species complex based on a more detailed morphology analysis and to find variable morphological features which can be used to separate them.

2 Materials and methods

2.1 Study sites and sampling

Ethical approval was obtained from the Animal Research Ethics Committee of the University of Jaffna (AERC/2015/04). Verbal consent was obtained from house owners to collect sandflies in their homes or land.

Sandflies were collected from Anuradhapura, Hambantota, Jaffna, Puttalam, and Jaffna

districts including the associated islands (Delft and Pungudutivu) during the period from 2015 to 2018. These dry zone areas were selected based on the previous studies reporting the sandflies and/or leishmaniasis. Sampling sites in each district were selected based on the accessibility. Therefore, locations such as Tangalle, Thanamalwila, Ambalantotta, and Mamadalla were selected from the Hambantota district. Pungudutivu (Ward 10) and Delft Island were selected from Jaffna associated islands. The Puttalam town area was selected from Puttalam district. Kahatagasdigiliya was selected from the Anuradhapura district. Chunnakam, Kokkuvil, Chulipuram, Chavakacheri, and Vaddukottai were selected from Jaffna district (Figure 1).

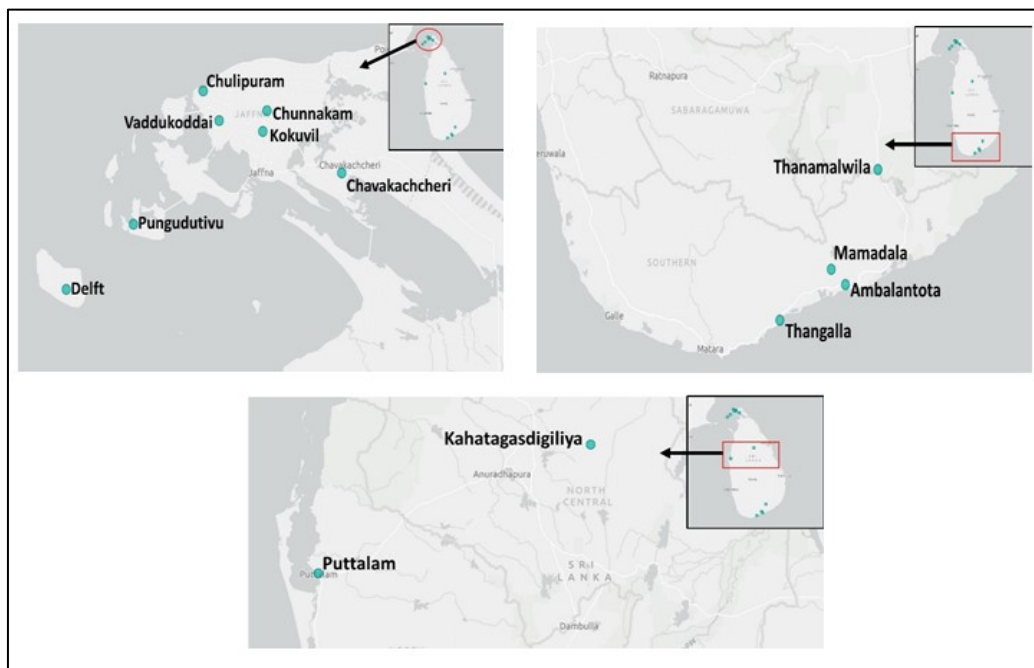


Figure 1 : A map indicating the sand-fly sampling locations

Sampling was done between 7 pm to 2 am and from 4 am to 6 am from 2015 to 2018 on monthly basis. Samples were collected from dark walls, cracked walls, poorly constructed house, and animal sheds. Adult male and female sandflies were collected using Cattle Baited Nets (CBN), Cattle Baited Huts (CBH), and Mouth aspirator collection techniques.

The cattle baited net was used to collect outdoor resting flies and the cattle baited hut was used to collect indoor resting flies. Usually, CBNC and CBHC were set up from 6 pm to 6 am. Sandflies were trapped inside the net. Mouth aspirator, with the help of light source was used to collect the resting flies within both cattle baited hut and cattle baited net. The collection was done with the help of entomology teams from Anti Malaria Campaign (AMC), Sri Lanka.

Anthropophilic sandflies feed and rest inside the houses. Those were found on the wall of old or poorly constructed houses, cloth hanger, toilets, and bedrooms. Therefore, those sandflies were caught by mouth aspirator collection using mouth aspirator from 7 pm to 9 pm and 1 am to 3 am.

2.2 Sample preservation

Collected Sandflies were usually anesthetized in the freezer for 5 minutes. They were preserved in 70% ethyl alcohol contained micro centrifuge tubes (1.5ml) with proper labeling once they were anesthetized. Labeling

was done with the details of the collection site, collection methods, numbers, and date of the collection. Finally, they were preserved in a -20°C freezer in the laboratory, Department of Zoology, University of Jaffna for further analysis.

2.3 Species identification

External and internal morphological characters were carefully identified using published taxonomic keys (Lewis, 1978) (Lane, 1993) (Ilango, 2004) (Ilango, 2010) (Ilango, 2011a) (Gajapathy *et al.*, 2011). Identified *Phlebotomus (Euphlebotomus) argentipes* were separated for further analysis. The sandflies were also separated and divided as males and females based on the external genitalia before the identification process.

The identified sandflies were temporarily mounted in distilled water to study some morphometric characteristics such as; the total length of the wings (length from wing base until the end of the wing vein), the maximum width of the wing (along the middle part of wings), the length of Radial vein 1 (R1), Radial vein 2 (R2), Radial vein 3 (R3), R2+R3, wing overlap (length of radial vein 1 overlapping the radial vein 2), lengths of thorax and halteres, length and the maximum width of the abdomen (at 4th segment of the abdomen), lengths of femur, length of tibia and length of basitrasus.

Flies were then dissected using a dissection needle and hook. Head, wing, and genital

organs were separated. The excess water was wiped out carefully before the mounting process. The permanent mounting was done in Berlese's medium for further analysis. A drop of the medium was placed on the slide and covered carefully without air bubbles before drying.

Mounted slides were observed under a trinocular microscope (CX21, Olympus, Tokyo, Japan), which is equipped with a moving Vernier scale and an ocular micrometer for measuring purpose. A datasheet was prepared to record the measurements.

2.4 Morphometry

Length of head, width of head, length of eye, width of eye, length of inter-ocular, total length

of antenna, total length of maxillary palp, segments of maxillary palps (P1, P2, P3, P4 and P5), length of antennal flagellomere 1,2,3 and 6, length of *sensilla chaetica* on AF1, AF2, AF3 and AF6, length of labrum, length of cibarium, total length of pharynx, maximum width of pharynx and minimum width of pharynx were measured from the head region. The measurement of structures such as length of wing, maximum width of wing, length of wing veins; such as, Radial vein 1 (R1), Radial vein 2 (R2), Radial vein 3 (R3), Radial vein 2+3 (R2+3) were taken (

Figure 2).

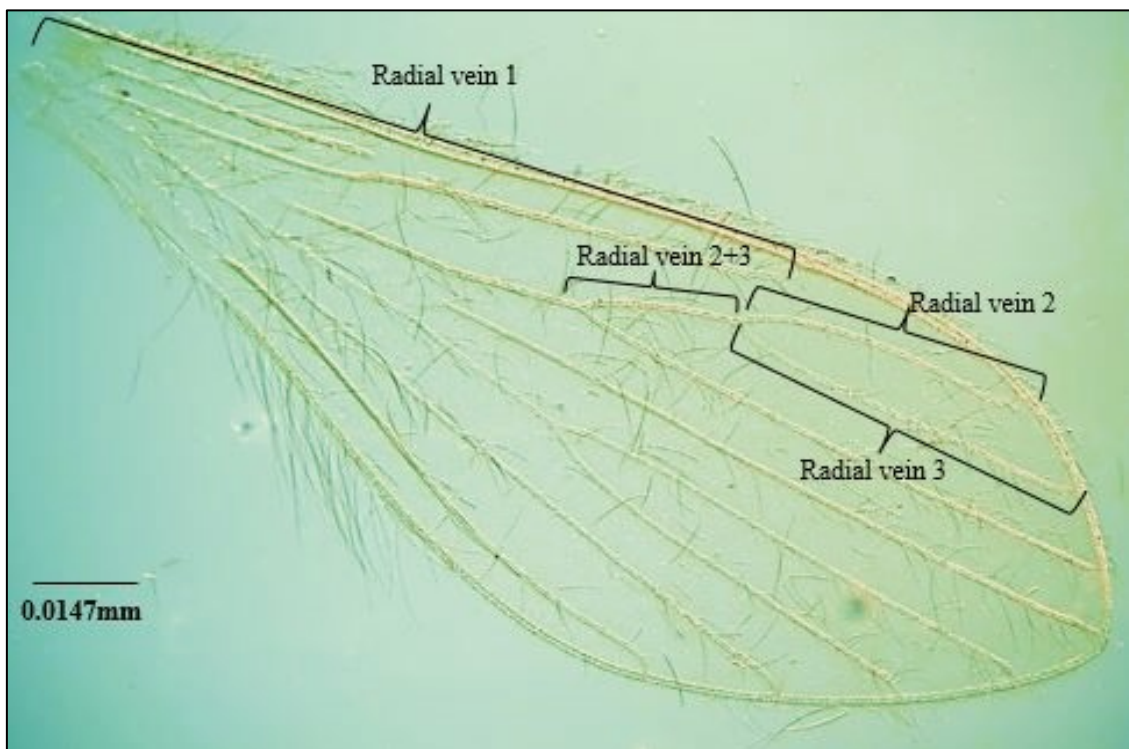


Figure 2 : Dorsal view of the wing of *Phlebotomus (Euphlebotomus) argentipes* male, illustrating the measured characters such as; length measurements of the radial vein 1, radial vein 2, radial vein 2+3 and radial vein 3 ($\times 100$).

The male genitalia contain aedeagus, cerci, styles, genital pump, parameres, surstyle, and coxite. Width of genital coxite, length of genital coxite, length of style, length of surstyle, length of paramere, aedeagal sheath, aedeagal filament and aedeagal pump were measured for males.

Length of thorax, length, and width of abdomen, length of halter, length of femur, and length of tibia were measured.

2.5 Statistical analysis

Characters were measured and converted to millimeters (mm). Statistical analysis was done in two methods. Assuming two different hypotheses for the classification of the sibling species, based on the taxonomic keys proposed by (Ilango, 2000) (Ilango, 2010), which are illustrated below;

Method 1

Morphospecies were differentiated as A and B based on the antennal flagellomere and *sensilla chaetica* length ratio based on the classification scheme proposed by Ilango (2000).

Method 2

Morphospecies were differentiated based on the coxite/style ratio (Ilango, 2010).

All the measured characters were analyzed using principal component analysis (PCA) in Minitab software (Minitab, Release version 16). The student t-test, ANOVA, and Turkey tests (Minitab Release version 16) were also performed.

3 Results and discussion

A total of 1250 males and 400 female flies were identified as *Phlebotomus (Euphlebotomus) argentipes* based on the identification characters such as armed pharynx, tri-lobed paramere, differentiated spermathecal end segments, etc. More flies were caught between 7 pm to 2 pm as well as 4 am to 6 am. A previous study (Senanayake *et al.*, 2015) also indicated the aggregation period of sandflies was between 8 pm to 11 pm. Moreover, the collection was low during the windy seasons (May, June, and July) in the Northern Province, Sri Lanka. It can be due to the wind speed is highly influencing in sandfly movement. Besides, the sandfly collection was high at the animal sheds, near toilets, near wells, bathrooms, cracked old walls, and poorly constructed houses. It can be due to its habitat preferences with moisture and shade. *Phlebotomus (Euphlebotomus) argentipes* species were mostly caught with cattle baited hut and cattle baited net. Number of flies collected from indoor hand collection using mouth aspirator was comparatively low than the outdoor hand collection. However, more sandflies were caught using cattle baited collection. It is because *Phlebotomus (Euphlebotomus) argentipes* are provided with an easy and large food source in cattle.

Morphospecies A and morphospecies B were differentiated based on the lengths ratio of *sensilla chaetica* on antennal flagellomere 2 (AF2) (Ilango, 2000). A fly with this ratio of 50% or more was classified as morphospecies

A and less than 50% was classified as morphospecies B (Ilango, 2000), (Figure 3).

According to the Table 1, 422 males and 242 females were identified as *Phlebotomus (Euphlebotomus) argentipes* species and

mounted with Berlese medium for gross morphological measurements. According to Ilango's (2000) classification, 506 flies were identified as morphospecies A whereas 158 flies are morphospecies B.

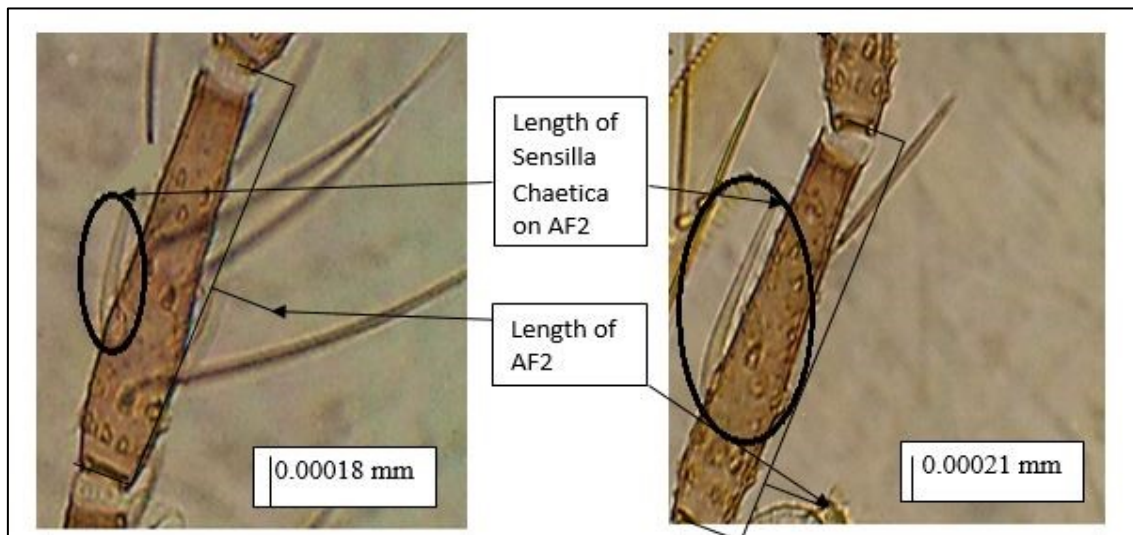


Figure 3: Antennal flagellomere and sensilla chaetica of *Phlebotomus (Euphlebotomus) argentipes* male morphospecies B (left) and male morphospecies A (right)

Table 1 : Number of prepared microscopic slides according to the classification proposed by Ilango (2000) for gross morphology analysis.

Measured samples	Male	Female
A	267	239
B	155	3

The number of female morphospecies B was very less compared with male morphospecies B. Delft Island was reported with predominant morphospecies B distribution in earlier studies (Gajapathy *et al.*, 2013). Therefore, different sampling sites and techniques were focused to catch them in Delft Island. However, it was observed that the population in the Delft Island also shifted towards dominant morphospecies A as more

than 80% of the samples belongs to morphospecies A in male flies, in the different collection methods as well.

3.1 Gross morphology analysis

Female *Phlebotomus (Euphlebotomus) argentipes* contains a pair of maxillae, mandibles, and a hypopharynx in between a dorsal labrum and a ventral labium. However, the male sandflies' mouthparts were smaller. The labrum can be identified based on its

sword shape. Labium is thick in its structure. *Phlebotomus (Euphlebotomus) argentipes* species has a pair of 16-segmented hairy antennae. The first segment of antenna is ring-shaped whereas the second one is globe shaped. However, the third antennal segment is the longest one. The fourth and fifth segments are nearly equal in length. The rest of the segments from six to sixteen become gradually shorter. Therefore, the last segment is the shortest one. Each antennal segment (3 to 15) has one or more sensilla chaetica or antennal ascoids which is a transparent, modified sensory hair. The palps are another important structure found in the head. Palps consist of five segments. It is attached to the base of the labrum. The cibarium is an internal structure located in the head between proboscis and pharynx. The pharynx is present posterior to the cibarium and consists of two dorsal and one ventral plate. The base of the pharynx has pharyngeal armature which is made up of spicules and teeth. The abdomen of the sandfly contains ten segments. The final three segments of the abdomen are transformed into genitalia in males. Coxite is paired and the largest part of male genitalia. Surstyles are paired, long and cylindrical and found on the ventral side. Parameres are also paired with three lobes; tri-lobed parameres. Aedeagus is a dark chitinous part that contains aedeagus sheath, aedeagus filament, and genital pump. The styles are paired with five spines which are attached to the ends of coxites.

Internal organs of female genitalia such as genital fork, spermatheca, and the spermathecal duct are taxonomically important. Paired spermatheca with ducts and paired cerci which are attached to the 10th abdomen segment are important characters from a taxonomic point of view.

Prothorax, Mesothorax, and Metathorax are three regions in thoracic segments. Each of these three segments has one pair of legs. Metathorax has a pair of reduced wings which is also known as halteres. Mesothorax has a pair of wings.

3.2 Statistical analysis

The following tests are based on the classification method as proposed by Ilango (2000). A two tail student t-test was performed with the following hypothesis:

Null hypothesis H₀:

Particular morphological character is not different among morphospecies A and morphospecies B.

Alternative hypothesis H₁:

Particular morphological character is different between morphospecies A and morphospecies B.

Statistical analysis could not be performed for female sandflies due to the lack of females caught in the collection.

Table 2 shows the significantly varying morphometric characters (P values < 0.05) among morphospecies A and B in males according to the classification scheme propose

by Ilango (2000). Seventeen characters were significantly varied (P values < 0.05) among morphospecies A and morphospecies B.

Principal component analysis (PCA) was done to check the variations and groupings among morphospecies A and morphospecies B. PCA is

a dimensionality reduction technique that enables to identify correlations and patterns in a data set so that it can be transformed into a data set of significantly lower dimension without loss of any important information.

Table 2 : Values obtained from student t-test (Microsoft excel, 2010) for male morphospecies A and B.

Character	P-value
Sensilla chaetica on AF2	3.21E-22
Sensilla chaetica on AF1	1.33E-15
Sensilla chaetica on AF3	6.42E-13
Sensilla chaetica on AF6	2.58E-11
Wing venation R3	3.88E-05
Pharynx minimum width	0.000742
Third Maxillary palp segment	0.001764
Inter ocular Length	0.002172
Wing venation R1	0.002704
Pharynx maximum width	0.003328
Total Length of Maxillary palp	0.005188
Fifth Maxillary palp segment	0.024369
Length of abdomen	0.028585
Wing venation R1 overlaps R2.	0.04975
Pharynx total length	0.005547
Length of Cibarium	0.006033
Wing venation R2	0.009494

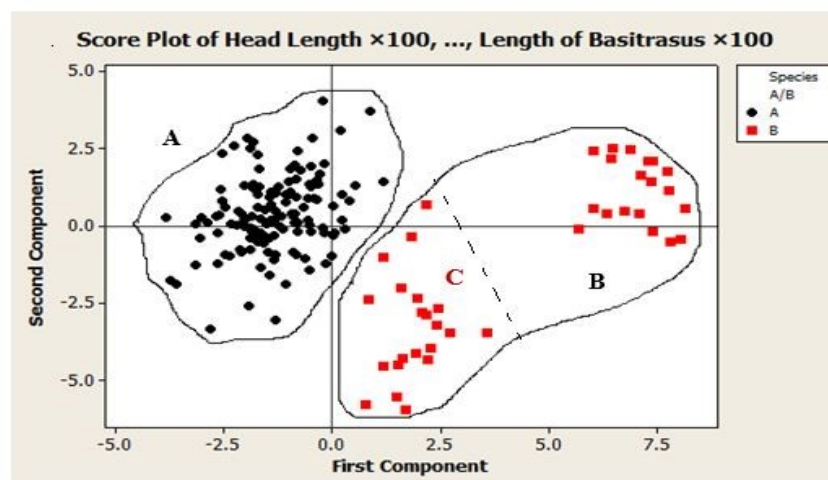


Figure 4 : Score plot of all measured characters of male *Phlebotomus (Euphlebotomus) argentipes* morphospecies A and morphospecies B based on SC2/AF2 ratio (Ilango,2000) in the study (sandfly) population.

The clusters obtained from PCA score plot for first two principal components revealed that there might be another group found within cluster represented by morphospecies B. The new cluster was named as group C (Figure 4).

A Student t-test (Microsoft excel 2010) was performed again to analyze the variation between morphospecies B and newly identified group C with the following hypothesis:

Null hypothesis H0: Particular morphological character is not different

among morphospecies B and morphospecies C.

Alternative hypothesis H1:

Particular morphological character is different between morphospecies B and morphospecies C.

The results are shown in Table 3.

Table 3 shows the significant difference (P values lower than 0.05) between the characters of morphospecies B and newly named morphospecies C. Twenty-five characters showed significant variations.

Table 3 The P values among clusters B and C obtained from student t-test (Microsoft Excel 2010).

Characters	P-Values
Labrum	0.001
Total Length of Maxillary palp	0.010
First Maxillary palp segment	0.031
Third Maxillary palp segment	0.026
Fourth Maxillary palp segment	0.013
Fifth Maxillary palp segment	0.001
Antennal Flagellomere AF1	0.038
AF3	0.009
Total Antenna	0.000
Length of Cibarium	0.055
Pharynx total length	0.000
Wing venation R1	0.000
Wing R1 overlaps R2	0.031
Coxite width	0.000
Coxite length	0.000
Style	0.017
Aedegal Sheath Filament	0.008
Genital Pump	0.016
Thorax	0.000
Halter	0.000
Length of Abdomen	0.000
Width of abdomen	0.000
Femur	0.000
Tibia	0.000
Basitarsus	0.000

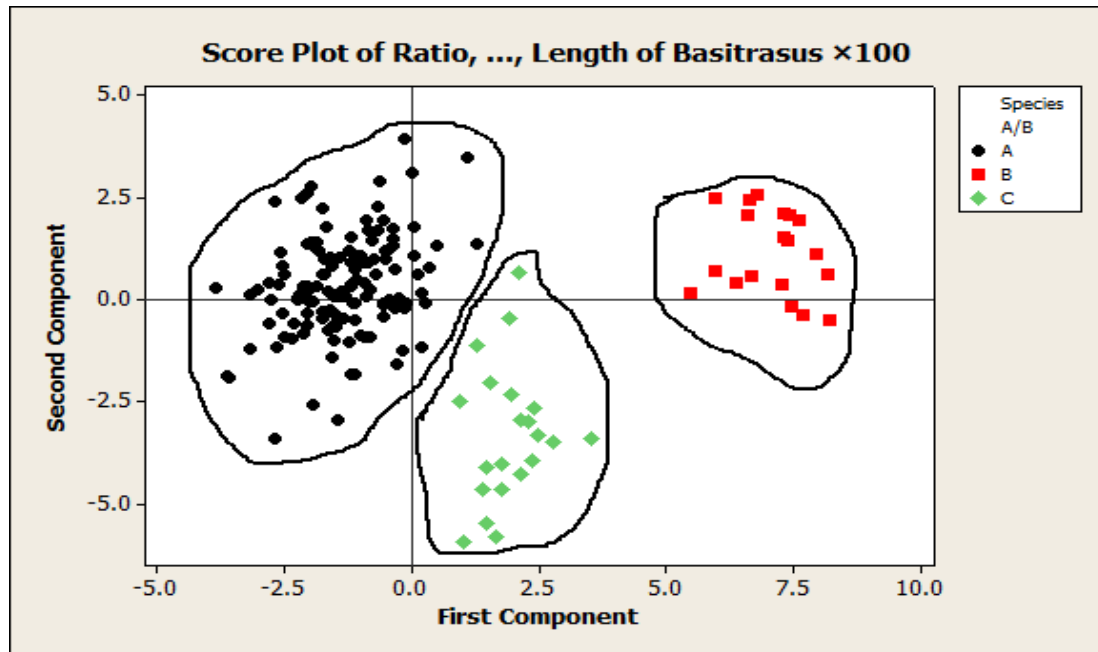


Figure 5 Score plot for all measured characters of male *Phlebotomus (Euphlebotomus) argentipes* morphospecies A, morphospecies B and morphospecies C in the study sandfly population.

The principal component analysis was done again for those three morphospecies (Figure 5), with the variable morphometric characters

Figure 5 revealed that there are 3 different clusters among *Phlebotomus (Euphlebotomus) argentipes* complex.

In the results, the first 15 principal components have Eigen values greater than 1 and they explain 67.7% of the variation in the data.

To check the variation in morphological characters between three morphospecies (A, B

and C) one-way ANOVA test was done with the following hypothesis:

Null hypothesis H0:

A particular morphological character is not different among all three species .

Alternative hypothesis H1:

Particular morphological character is different in at least one species.

Based on the ANOVA test following 5 morphometric characters were found to be different among three species.

Table 4 :ANOVA test results for group A, group B, and group C.

Characters	F values	P values
Fifth Maxillary palp segment	30.19	0.000
Pharynx total length	42.61	0.000
Genital coxite width	9.67	0.000
Length of abdomen	48.87	0.000
Width of abdomen	15.24	0.000

ANOVA test is not useful to differentiate exact variations among all the 3 groups. It only means at least one group is different from the other groups. So, Turkey test was performed as a mean separation technique.

According to the results, the mean values of length of fifth maxillary palp segment, total length of pharynx, width of genital coxite, total length of abdomen, and width of abdomen are varied among all morphospecies (A, B and C). It can be proposed that, the above mentioned characters can be used to differentiate the morphospecies A, B, and C for Sri Lankan *Argentipes* complex (males).

In the method 2, all the morphospecies were differentiated based on the coxite/style ratio (Ilango, 2010). Ilango (2010) reassessed the classification of the complex based on coxite/style ratios. According to the ratio

between coxite and style, the complex was classified as 3 species; namely, *Ph. annandalei*: *Ph. argentipes*s.s. and *Ph. glaucus*. Thus the ratio between coxite and style for *Ph. annandalei*: *Ph. argentipes* s.s.: *Ph. glaucus* are more than 1.75, in between 1.65 to 1.75, and less than 1.5, respectively.

But the current research has found males with an intermediate value (1.5-1.65) for the ratio of coxite/style. So, it was further classified as four groups based on this reassessment by Ilango (2010). Values equal or less than 1.5 was named as group 1, in between 1.5 and 1.65 was named as group 2, in between 1.65 and 1.75 was named as group 3 and more than 1.75 was named as group 4. The principal component analysis was done based on this assumption and the results are shown in Figure 6.

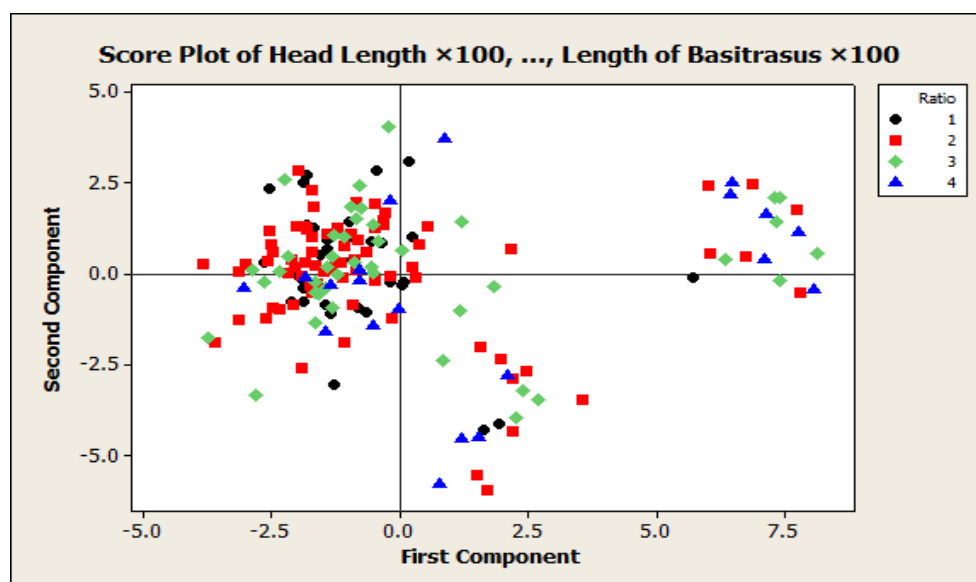


Figure 6 : Score plot for all measured characters of male *Phlebotomus (Euphlebotomus) argentipes* morphospecies based on coxite/style ratio (Ilango,2010) in the study (sandfly population)

According to figure 6, there is no clear grouping found. Therefore, the coxite/style ratio cannot be applied to Sri Lankan male sandflies. So, all following tests and analysis were done based on the method 1; assuming that the morphospecies are classified based on the length ratio of the sensilla chaetica and the antennal flagellomere of the fourth antennal segment or second antennal flagellomere.

3.3 Validation of grouping results.

According to the results, the male *Phlebotomus (Euphlebotomus) argentipes* was classified into

three morphospecies based on the following characters.

1. Length of fifth maxillary palp segment
2. Pharynx total length
3. Genital coxite width
4. Length of the abdomen
5. Width of the abdomen

Hence, the lengths shall vary based on the age of the sandflies, the ratio of these lengths with the total length of the respective sandfly was taken to verify the above results.

Table 5 : ANOVA test results for the ratio of significant characters with the total length of sandfly; F value and P values are shown.

Characters	F-value	P-value
Length of fifth maxillary palp / Total length of sandfly	179.71	0.000
Length of Pharynx/ Total length of sandfly	203.92	0.000
Width of genital coxite/ Total length of sandfly	168.21	0.000
Length of abdomen/ Total length of sandfly	58.90	0.000
Width of abdomen/ Total length of sandfly	11.83	0.000

From the Table 5, it was clear that all the characters have shown significant variation regardless of the size of the sandfly. A Turkey test was performed to confirm this. Except for the width of abdomen, mean for all the other characters showed distinct variation for three morphospecies.

Total mean value of the width of fifth maxillary palp segment/ total length of sandfly for morphospecies B is higher than A and C. Therefore, the ranking based on the mean value for the length of fifth maxillary palp is

B>C>A. The mean value based on the total length of pharynx/total length of sandfly is B>C>A. Total mean value of width of coxite/ total length of sandfly for morphospecies B is higher than A and C. Therefore, the ranking based on the mean value for width of coxite/total length of sandfly is B>C>A. Total mean value of length of abdomen/ total length of sandfly for morphospecies A is higher than B and C. Therefore, the ranking based on the mean value for the length of abdomen is A>C>B.

ANOVA test revealed that at least one species is different from the other two species based on width of abdomen/ total length of sandfly for morphospecies A, B, and C. According to Tukey test, the mean of ratio of width of abdomen/ total length of sandfly of morphospecies C different from A and B. However, there is no significant difference in mean of ratio of width of abdomen/ total length of sandfly between among morphospecies A and morphospecies B.

Thus, the abdomen width is identified as an improper character for discrimination of

Table 6 : Maximum and minimum lengths (mm) of identified significant characters for all three morphospecies.

Characters	Morphospecies A		Morphospecies B		Morphospecies C	
	Min	Max	Min	Max	Min	Max
Fifth maxillary palp	0.07	0.205	0.1275	0.2275	0.1275	0.195
Total length of pharynx	0.12	0.2	0.17	0.2175	0.1575	0.205
Width of coxite	0.075	0.125	0.09	0.125	0.09	0.107
Length of abdomen	0.18	1.35	0.1	0.8	0.18	1.3

4 Conclusion

In this research, females were not used for statistical analysis due to a lack of females belong to morphospecies B in all samples. There were only three female flies from morphospecies B were identified. PCA analysis for male samples shown a new third group lies within the complex based on the score plot. The third group was termed as morphospecies C. Based on the statistical analysis, it was found that the fifth segment of maxillary palp, total length of pharynx, width of coxite and length of abdomen can be used to separate Sri Lankan male *Phlebotomus (Euphlebotomus) argentipes* morphospecies. It was found that the classification based on coxite and style ratio

morphospecies. All the other characters such as, fifth maxillary palp, total length of pharynx, width of coxite and length of abdomen can be used in morphospecies discrimination for *Argentipes* complex.

shows the minimum and maximum lengths of measured significant characters (fifth maxillary palp, total length of pharynx, width of coxite and length of abdomen) for all three morphospecies.

cannot be applicable for Sri Lankan male *Phlebotomus (Euphlebotomus) argentipes*.

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Authors' contribution

KG and SNS conceived the study; SP did the field and laboratory work; KG, SNS, and SP contributed in writing the manuscript.

References

- Ababa, A. (2007). *Report of the fifth consultative meeting on Leishmania / HIV*. Geneva: World Health Organization.
- Gajapathy, K., Jude, P. J., & Surendran, S. N. (2011). Morphometric and meristic characterization of *Phlebotomus argentipes* species complex in northern Sri Lanka: evidence for the presence of potential leishmaniasis vectors in the country. *Tropical Biomedicine*, 28, 259-268.
- Gajapathy, K., Peiris, L. B., Goodacre, S. L., Silva, A. J., & Surendran S, N. (2013). Molecular identification of potential leishmaniasis vector species within the *Phlebotomus (Euphlebotomus) argentipes* species complex in Sri Lanka. *Parasites Vectors*, 6, 302. doi:doi: 10.1186/ 1756-3305-6-302.
- Ilango, K. (2000). Morphological characteristics of the antennal flagellum and its sensilla chaetica with character displacement in the sandfly *Phlebotomus argentipes* Annandale and Brunetti sensu lato (Diptera: Psychodidae). *Journal of Biosciences*, 25(2), 163-172.
- Ilango, K. (2004). Phylogeny of the old world Phlebotomine sandflies (Diptera: Psychodidae) with special reference to spermathecae morphological diversity. *Oriental Insects*, 38, 419-460.
- Ilango, K. (2010). A taxonomic reassessment of the *Phlebotomus argentipes* species complex (Diptera: Psychodidae: Phlebotominae). *Journal of Medical Endomology*, 47(1), 1-15. doi:10.1603/033.047.0101
- Ilango, K. (2011a). Radiation of the oriental Phlebotomine sandflies (Diptera: Psychodidae). *Insect Science*, 18(5), 590-606. Retrieved from <https://doi.org/10.1111/j.1744-7917.2010.01378.x>
- Ilango, K. (2011b). Spacial and temporal distribution of Phlebotomine Sandflies in relation to Leishmaniasis in India. In B. K. Tyagi, & V. Veer (Eds.), *Entomology (Ecology & Biodiversity)* (pp. 99-103). Jodhpur, India: Scientific Publishers (India).
- Kariyawasam, K. K., Edirisuriya, C. S., Senerath, U., Hensmen, D., Siriwardana, H. V., & Karunaweera, N. D. (2015). Characterization of cutaneous leishmaniasis in Matara district, southern Sri Lanka: evidence for case clustering. *Pathogens and Global Health*, 109(7), 336-343. doi:10.1179/2047773215Y.0000000032
- Lane, R. P. (1993). Sandflies (Phlebotominae). In R. P. Lane, & R. W. Crosskey (Eds.), *Medical Insects and Arachnids* (pp. 78-119). Dordrecht, Switzerland: Springer. Retrieved from https://doi.org/10.1007/978-94-011-1554-4_4
- Lewis, D. J. (1978). Phlebotomine sandflies (Diptera, Psychodidae) of the oriental region. *Bulletin of the British Museum (Natural History)*, 37, 218-331.
- Navaratna, S. S., Weligama, D. J., Wijekoon, C. J., Dissanayake, M., & Rajapaksha, K. (2007). Cutaneous leishmaniasis, Sri Lanka. *Emerging Infectious Diseases*, 13, 1068-1070.
- Senanayake, S. A., Abeyewicreme, W., Dotson, E. M., & Karunaweera, N. D. (2015). Characteristics of Phlebotomine sandflies in selected areas of Sri Lanka. *The Southeast Asian Journal of Tropical Medicine and Public Health*, 46(6), 994-1004.
- Shemshad, K., Kassiri, H., Lotfi, M., & Shemshad, M. (2013). Relationship trend analysis of cutaneous leishmaniasis prevalence and climatological variables in Shush country, south-west of Iran. *Academic Journal of Entomology*, 6(2), 79-84.
- Tapia, F. J. (2014). Do not forget leishmaniasis (Editorial). *Journal of Microbiology & Experimentation*, 1(3), 115-116.
- Thakur, C. P. (2006). Leishmaniasis research- the challenges ahead. *Indian Journal of Medical Research*, 123, 193-194.

Recently Discovered Ruins of Civaṇ Temple with Tamil Inscriptions at Tirumaṅkalāi Area in Trincomalai District, Sri Lanka

Pushparatnam, P.

Former Professor of History, University of Jaffna, Sri Lanka.

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Abstract

During the Chōla rule for 77 years (from 993 A.D. to --1077 A.D) with Polanaruwa as capital in Sri Lanka, Hindu temples built outside of Polanaruwa outnumbered the temples within Polanaruwa. Yet, most of these temples have not been identified, studied and documented so far. Recently discovered ruins of Civaṇ temple in Tirumaṅkalāi forest area in Trincomalai District stand testimony to this fact. This temple was constructed with granite stones and bricks with the adoption of Chōla art tradition. Presently all portions of the temple except the Antarālam right in front of the Karpakirakam (Ante-chamber to the inner sanctuary of a Hindu temple) are in a state of ruin. The granite pillars with artistic workmanship, bricks, Āvuṭai (where in the Linga is placed), pedestals, shrines for Minor Gods and Tamil inscriptions found among the ruins are evident of the fact that this temple has been bigger than the second Civaṇ temple in Polanaruwa.

So far, five Tamil inscriptions have been discovered among the temple ruins. Three inscriptions among them belong to 10 and 11 century A.D. These inscriptional evidences conform that this temple was influential during the Chōla period. The other two inscriptions state about the donations offered to this temple in 15th and 16th century A.D. These evidences make us ascertain that this temple continued its influence even after the Chōla period.

It is learnt that Bronze images of God, Statues and Sculptures from ruins of this temple were removed to other places by people. In support of this belief, temple bell with the name “Tirumaṅkalāi Civaṇ temple “inscribed on it was found at Kaṅkuvēly in Trincomalai district. Hence, it is hopeful that more details about the Tirumaṅkalāi Civaṇ temple could be brought into light if further excavation is carried out in the location of this temple.

Corresponding author: Dr.P.Pushparatnam, Former Professor of History, University of Jaffna, Sri Lanka.
e-mail: pushpa1252000@gmail.com



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Keywords: Civaṇ temple, Tirumaṅkalāi, Kīliveiveṭṭy Kaṅkuvēly, Chōlas, Dravidian art tradition, Agamic and Non-Agamic.

1 Background

Tirumaṅkalāi Civaṇ temple is considered to be one of the ancient temples with continuous historical importance that are found so far in places highly populated by Tamils in Sri Lanka. It is located amidst the dense forest approximately ten kilometres away from the main road of Kīliveiveṭṭi area in Trincomalee District. Electric fences are built around this area for the protection of people due to the presence of thick forest within the circumference of around seven kilometres of the temple and considered to be a place of increased movement of elephants. This barrier could be the main cause for the negligence of the area during archaeological and historical researches conducted in Eastern Sri Lanka (Figure 1).



Figure 1: Front view of the Temple

2 Archeological Investigation and Discussion

In that situation, a friend from Cēruvil has understood the importance of this temple and sent us the photos of ruins of the temple through the officer of Archaeological Department of Jaffna region, Mr. V. Manimaran. Accordingly we conducted an extended archaeological exploration during 2017 and 2018 with the Project Manager for Jaffna Project of Central Cultural Fund Mr. Lakshman Santhana Maithiripala, the officers of Archaeological Department Mr. Manimaran, Mr. Kapilan and Archaeological special undergraduate students of University of Jaffna. It was proved through the research that the Karpakirakam, Antarālam, Muṇmaṅṭapam (Lobby), exterior wall and sub shrines of this ruined temple were built using granite and bricks (Figure 2).



Figure 2: Damaged condition of Antharalam

This is further proved by the damaged ruins of the temple walls, foundations, the building

components that are buried in soil and granite stone pillars that are identified all around in the temple as well as in its premise. The Karpakirakam and Vimāṇam built on the Karpakirakam of this temple are fully extinct while the ground level where Karpakirakam was seen is now a large earthen pit. The earthen pit was said to be dug by treasure hunters. Only the Antarālam conjoined to Karpakirakam could be identified even though it is damaged. The temple walls of approximately five feet in length, breadth and height were built using bricks whereas their roof tops were built with granite stones (Figure 3).



Figure 3: *Artistic Granit Pillars*

The entrance that was built using granite stone pillars is approximately of three and a half feet width and four feet height. It is seen that a Shiva Lingam that was constructed on this Antarālam in later days is being worshiped by some people visit the place at present. The foundation of Muṇmaṇṭapam that is 16 feet long and 5 feet wide proves that Muṇmaṇṭapam and Alter were built conjoined to Antarālam. A Tīrtakiṇṇaru of the temple that was deep and

built using granite stones in three feet long and wide could be seen on the left side of the Muṇmaṇṭapam. The presence of exterior walls and the sub shrines for Minor gods is proved through the foundations and existing bricks and granite stones in the premise.

There are a lot of granite stone pillars, arch pillars with decorative engravings, balconies, pedestals where statues of gods were placed, balconies, Kōmuki and Kōṭuṅkai could be seen next to the temple (Figure 4).



Figure 4: *Pillars and Bricks are found nearby the temple*

Most of them are buried inside the earth. When looking at the architectural styles of the shape of e granite stone pillars and the decorations and engraved statues in them, pedestals, balconies and Kōmuki, they reflects the Dravidian architectural style of Hindu temples of middle age Tamil Nadu and Sri Lanka. Close similarities could be identified on architectural styles when comparing the second Civa temple built in Polonnaruwa during Chōla reign and

Tirumañkalāi Civaṇ temple and at the same time Tirumañkalāi Civaṇ temple can be considered to be large in size (Figure 5)



Figure 5: *Tamil Inscriptions Inscribed on Pillars*

This should further be proved by the future archaeological excavations that will be conducted in Tirumañkalāi Civaṇ temple.

The five Tamil inscriptions discovered within the ruins of the temple play an significant role in the research on the history of this temple. There are high chances of many other Tamil inscriptions buried in the earth alone with these inscriptions. The inscriptions found here were believed to be embedded in the granite stone pillars of the temple (Figure 6).



Figure 6 : *Tamil Inscriptions (Stampages)*

The main reason would be for letting the people who come to worship the temple to know the history of the temple. In general inscriptions, copper plates and inscribed coins were issued on the contemporary period when the historical events occurred. Therefore, the

chances of interpolation, exaggeration and imaginative stories like in historical literatures are very low here. Thus, the inscriptional evidences are considered to be of highly reliable in archaeological researches. All the five Tamil inscriptions found in Tirumañkalāi

Civaṅ temple were issued in different years and for various purpose. The historical evidences on the origin of this temple, the development of the temple, temple administration and rituals happened in the temple as well as people who have served for the development of the temple can be found from these evidences. Three of those inscriptions are datable to the 10th and 11th century A. D on paleographical grounds (Pushparatnam, 2017). The inscriptions describe record on the administrative regulations of the temple and the donation (donation made with money) given to the temple by officials like Siṛṛampalam Uṭaiyāi, Tiruveṅṅaikkūṭṛaṅ Tiruvarahiruvaraṅkam and other welfare of the society (Figure 7).



Figure 7: *Present Condition of Temple's Karpakirakam*

The other two inscriptions were issued in 15 and 16 century A.D. These inscriptions record on the information on giving cows as donation

to the temple by some welfare lived in the society.



Figure 8 : *Temple's Bell with Tamil Inscription*

Further the charter embossed in a bell that was being in use of the temple plays a vital role in knowing the importance of the temple and the period of the temple being worshiped. Based on the epigraphy of the charter the bell is found to belong to 17th century A. D. Thus, as of the calculations of years, it is proved that the temple was under worship by people for more than 700 years (Pushparatnam, 2017). The bell of this temple is in Kaṅkuvēly village of Trincomalee district at present. It is know that the religious symbols including the bell that were in use during worship by the people lived in Tirumaṅkalāi for generations took them all to places they displaced since 1964. The bell that was taken is now kept well protected in Kaṅkuvēly village. This statement is further confirmed by the inscription engraved in the temple bell as “the donation by Pattaṅ the son

of Pattipeṭi lived in Tirumaṅkalāi to the Tirumaṅkalāi Civaṇ temple (Figure 8).

Moreover, some historical evidences on the temple are exposed when the inscriptions found in the ruins of the temple are studied with the historical background of the natives of the area. The early civilization history of this area was begin 2800 years ago with Megalithic culture or Early Iron Age Culture. Therefore the pioneering worship culture of Hindu religion could have initiated in the religious believe of these people in Sri Lanka similar to South India (Sitrapalam, 1996, p. 182). Mahawamsa, One of the first historical literatures of Sri Lanka in Pali chronicles that there were Hindu temples in Sri Lanka even before the introduction of Buddhism to Sri Lanka (Gaiger, 1950, p. X : 89). The researcher conducted studies on the native history of Trincomalee, provide Bramic inscriptions as evidence on the existence of Hindu religious worshiping culture even before 2200 years (Paranavithane, 1970, pp. 894,1120,1137,1149) (Gaiger, 1950, pp. X;102, XIX 37) (Pushparatnam, 2003). The existence of three Hindu temples in Eastern Sri Lanka before 1600 years is stated in Mahawamsa (Gaiger, 1950, p. XXXVI:4). The Tirukkōṇēśvarar temple in Eastern Sri Lanka and Tirukkēśvarar temple in Northern Sri Lanka was given priorities next to Tamil Nadu in the songs of Nāyanmār who led the Paktī movement on Saivism and Tamil language in Tamil Nadu (Pathmanathan, 2003).

Many Hindu temples were built in Sri Lanka by the Chōla officers lived in the country at times of Chōla reign and some Tamil trade guilds. A substantial number of temples were built in Trincomalee is evidenced through inscriptions by them (Pathmanathan, 2003, pp. 160 - 172). However, the information on the places of the temples built in, their architectural styles and the gods of worship was not identified yet. The main reason for the destruction to temple is the policy of vandalism demolishing of culture practiced against native religions by the Portuguese and Dutch who ruled the coastal regions of Sri Lanka since 16th Century (Indrapala, 1970). Hence the location of Tirumaṅkalāi Civaṇ temple away from the reign of European and into the country aside to the dense forest could be the reason of great escape from cultural vandalism. Therefore the history of this temple that was worshiped for more than 1000 years is brought out into light.

The architectural style of this temple, the culture of the religious symbols found in the ruins of the temple and the stone inscriptions found in the area confirm the origin and growth of the temple from 10th Century A.D. However, the place could possess a long history that can be the reason for establishing a temple before 1000 year in contrast to the condition of the place as a dense forest at present. The researches were undertaken in the pits dug out for several reasons in the surrounding area of the temple provide further evidences identified

through the potteries, ancient roof tiles and terracotta figures that belong to various era. The different types potteries are identified to be belonged to 8th century A.D. Thus, considering them the reliable evidence, it could be proved that people lived in this area before 8th century A.D.

The culture of constructing temple in Agama tradition using stones initiated after the rise of dynasty of Pallava/reign in Tamiḷnāṭu in 6th century A.D. The continuous development of the culture could be seen in temples of Chōla and Pāṇṭia who succeeded Palavas. The culture has influence the contemporary Sri Lanka which is evident through the Hindu temples in Pallawa architecture found in Anuradhapura (Indrapala, 1970). The inscriptions and literatures state presence of temples for native gods that do not belong to Agama tradition in Tamil Nadu and Sri Lanka. Hence those temples were built using perishable materials like soil, timber and straw the architectural style and their traditions could not be fully identified. Due to the presence of dense human settlements in these areas conjoining the temples the temples of Agama tradition following the Pallawa architecture of using stones were established in the same places. Even though there are several village temples of non-Agama tradition could be seen in Tamil Nadu and Sri Lanka that are worshiped by people at present, many temples of non-Agama tradition are transforming to Agama tradition

following the new architectural style introduced by Pallawa. These transformations have not only bring changes to the architectural styles of the building constructed using stone but also bring changes to the names of gods worshiped in temples of non-Agama tradition. For example, instead of some famous gods worshiped in temples of non-Agama tradition like Vairavar, **Aṇṇamār**, **Nātaṇpiran**, Turkai and **Kāḷi** were changed names in temples of Agama tradition as Civaṇ, Murukan, Amman, Parvati and Puvaṇēśvariamman. Therefore, the origin of Tirumaṅkalāi Civaṇ temple could be the transformation of a non-Agama temple of 10th century to a temple of Agama tradition or the temple could be built newly due to the importance of the Tirumaṅkalāi area in those days.

Those who are willing to conduct researches on this temple can consider this to be a national heritage of Sri Lanka based on the historical antiquity of it. Else it could be considered an ancient cultural heritage of Hindu religion or a long lost temple of worship. However, in our opinion, the temple vividly shows the native history and culture of Sri Lankan Tamils especially the people of Eastern Sri Lanka disguised in the history of the temple. Because the temples of Dravidian architectural styles were built mostly in administrative capitals, commercial centers, port cities and places of historical importance rather than common human settlements in the cultural history of

middle age Sri Lanka and Tamilnāṭu. The Tamil inscriptions written in 10th and 13th century A.D. in Sri Lanka prove the fact. As the Tirumaṅkalāi Civaṇ temple originated in this era, it could be stated that one or many of above identified causes can be the reason for origin of

the temple. This could further be evident by the existence of ruins of two Hindu temples built in contemporary period to this temple. This could bring light to the unveiled history of the Eastern Sri Lanka if only further researches are conducted in these areas.

References

- Gaiger, W. (Ed.). (1950). *Mahavamsa*. Colombo: Ceylon Government Information Department.
- Indrapala, K. (1970). *Dravidian Architecture in Ceylon (in Tamil)*. Colombo: Kumaran Publishers.
- Paranavithane, S. (1970). *Inscriptions of Ceylon: Early Brahmi Inscriptions*. Colombo: Department of Archaeology, Sri Lanka.
- Pathmanathan, S. (2003). The Hindu Temples of Sri Lanka. In P. Harrigan (Ed.), *Glimpsis of Hindu Heritage* (pp. 160-172). Colombo: Ministry of Hindu Religious Affairs, Sri Lanka.
- Pushparatnam, P. (2003). Muruka Worship in Sri Lanka: New Archaeological Evidences. In P. Harrigan (Ed.), *Glimpsis of Hindu Heritage* (pp. 182-185). Colombo: Ministry of Hindu Religious Affairs, Sri Lanka.
- Pushparatnam, P. (2017). *Ceylon Tamils – A Concise History (in Tamil)*. Malaysia: Tamil Education Service, Switzerland.
- Sitrampalam, S. K. (1996). *History of Hinduism in Sri Lanka up to 500 A.D.(in Tamil)*. Jaffna: University of Jaffna.

Research Article

இலங்கையில் தமிழ் - சிங்கள அரசு வம்சங்களுக்கிடையில் நடைபெற்ற திருமண உறவு: ஒரு வரலாற்றுப் பார்வை

அனித்தா சசிகரன்

வரலாற்றுத்துறை, யாழ்ப்பாணப் பல்கலைக்கழகம், இலங்கை.

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ஆய்வுச்சுருக்கம்

தென்னாசியாவில் தொன்மையான, தொடர்ச்சியான வரலாற்று இலக்கிய மரபு கொண்ட நாடு என்ற சிறப்பு இலங்கைக்கு உண்டு. அவற்றை வெளிப்படுத்தும் முதல் பாளி இலக்கியங்களான தீபவம்சம், மகாவம்சம் ஆகிய நூல்களில் இலங்கையின் மனித வரலாறும், பண்பாட்டு வரலாறும் கி.மு. 6ஆம் நூற்றாண்டில் வட இந்தியாவில் இருந்து ஏற்பட்ட மக்கள் புலப்பெயர்வுடன் தோன்றியதாகக் கூறுகின்றன. இதே பாளி வரலாற்று இலக்கியங்களில் தென்னாசியாவில் தமிழகத்தை அடுத்து தமிழர் வாழ்ந்த நாடாகக் கூறப்படும் இலங்கையில் தமிழர்களை அக்கரையில் இருந்தும், சோழ, பாண்டிய நாடுகளில் இருந்தும் வணிகர்களாக, படையெடுப்பாளராக வந்துபோன அந்நியர்கள் என்ற பொருள்படக் கூறுகின்றன. பிற்காலத்தில் இப்பாளி இலக்கியங்களை மூலநூல்களாகக் கொண்டிருந்த வரலாற்று ஆய்வுகள் பலவும் வடஇந்திய குடியேற்றத்தை ஆரியர் குடியேற்றம் எனவும், அவர்களின் வழிவந்தவர்களே சிங்கள மக்கள் எனவும், தமிழர்கள் அவ்வப்போது இலங்கைக்கு வந்து சென்ற அந்நிய நாட்டவர்கள் எனப் பொருள்படக் கூறுகின்றன. ஆனால் கி.மு.3ஆம் நூற்றாண்டில் இருந்து இலங்கையின் அரசியல் வரலாற்றைத் தொடர்ச்சியாகக் கூறும் பாளி இலக்கியங்கள் கி.மு. 3ஆம் நூற்றாண்டில் இருந்து இலங்கையில் தமிழ் - சிங்கள மன்னர்கள் மாறிமாறி ஆட்சி செய்த வரலாற்றைக் கூறுகின்றன. இந்த அரசியல் வரலாற்றில் அல்லது ஆதிக்கப்படர்ச்சிக்கான போராட்டத்தில் சிங்கள மன்னர்கள் சார்பில் தமிழ்படைவீரர்களும் தமிழர்களின் படையில் சிங்களப்படை வீரர்களும் இருந்ததற்கும்

பங்குகொண்டதற்கும் பாளி இலக்கியங்களிலேயே ஆதாரங்கள் காணப்படுகின்றன. இந்த இணக்கப்பாடு அல்லது ஒற்றுமை என்பது அரசியலில் மட்டுமன்றி திருமண உறவுகளிலும், வர்த்தகத்திலும், மதத்திலும், கலைத்துறையிலும் ஏற்பட்டிருந்தமைக்கு பல ஆதாரங்கள் காணப்படுகின்றன. ஆயினும் இலங்கையின் ஆதிகால, இடைக்கால வரலாறு பற்றி ஆராய்ந்த அறிஞர்கள் தமிழ் - சிங்கள மக்களிடையே இருக்கக்கூடிய இனநல்லுறவினை முன்னிலைப்படுத்தி ஆய்வு செய்வதைக்காட்டிலும் அவர்களுக்கிடையிலான முரண்பாடுகளை முன்னிலைப்படுத்தி கூறுவதிலேயே அதிக அக்கறை செலுத்தியுள்ளனர். எனவே வரலாற்றுக் காலத்திலிருந்தே தமிழ்-சிங்கள சமூகங்களிடையே நல்லுறவு இருந்தது என்பதை வெளிக்கொணர்தல், இன்றைய தமிழ்-சிங்கள சமூகத்தினருக்கும் கடந்தகால இச்சமூகங்களுக்குமிடையே ஒரு நெருங்கிய திருமண உறவு வெவ்வேறு காலப்பகுதிகளில் நடைபெற்றிருந்தது என்பதை எடுத்துக்காட்டுவதனுடாக இன, மத முரண்பாடு தொடர்பான எண்ணப்போக்கு, விரோத மனப்பாங்குகளை நீக்கி ஐக்கியத்தை ஏற்படுத்துதல் என்பன இவ்வாய்வின் பிரதான நோக்கங்களாக உள்ளன. இவ்வாய்வுக்காக முதலாம் நிலைத்தரவுகள், இரண்டாம் நிலைத்தரவுகள் என்ற அடிப்படையில் சான்றுகள், ஆதாரங்கள் எடுத்துக் கொள்ளப்படுகின்றன. முதலாம் நிலைத்தரவுகள் என்ற அடிப்படையில் பாளி, சிங்கள, தமிழ் இலக்கியங்கள், பிறநாட்டார் குறிப்புக்கள் மற்றும் தொல்பொருள் மூலாதாரங்கள் என்ற வகையில் தமிழ், சிங்களக் கல்வெட்டுக்கள் போன்றன கையாளப்பட்டுள்ளன. இரண்டாம் நிலைத்தரவுகள் என்ற அடிப்படையில் இவ்வாய்வுத் தலைப்புடன் தொடர்புடைய

Corresponding author: Mrs.Anitha Sasikaran, Lecturer, Department of History, Faculty of Arts, University of Jaffna. e-mail: anithas@univ.jfn.ac.lk



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விடயங்களைத் தரும் நூல்கள், ஆய்வுக் கட்டுரைகள், சஞ்சிகைகள், இணையத்தளக்கட்டுரைகள் நாளிதழ்கள் போன்றவை பயன்படுத்தப்பட்டுள்ளன. எனவே வரலாற்றுக் காலந்தொட்டு தமிழ்-சிங்கள மக்களிடையே நல்லுறவு இருந்ததற்கான ஆதாரங்கள் கிடைக்கப்பெறுவதன் மூலம் இலங்கையில் ஒரு பல்லினப்பண்பாடு கொண்ட சமுதாயம் வரலாற்றுத் தொடக்க காலத்திலிருந்தே தோன்றி வளர்ந்தது எனலாம்.

திறவுச்சொற்கள்: தமிழர்; சிங்களவர்; திருமண உறவு; அரசவம்சம்; இலங்கை;

1 அறிமுகம்

இலங்கையின் வரலாற்றுக் காலத்திலே அநுராதபுரம், பொலன்னறுவை, யாழ்ப்பாணம், தம்பதெனியா, யாப்பகுவா, கம்பளை, கோட்டை ஆகிய அரசுகளை தமிழ், சிங்கள, இலம்பகர்ண, கலிங்க மன்னர்களும் கண்டிய இராசதானி காலப்பிற்பகுதியில் நாயக்க மன்னர்களும் மாறிமாறி ஆட்சி செய்து வந்துள்ளனர். இருப்பினும் தமிழ் - சிங்கள மன்னர்களுக்கெனத் தொன்மையான, தொடர்ச்சியான, இணைந்த வரலாறு காணப்படுகின்றன. இலங்கையில் பதவியிழந்த சிங்கள மன்னர்கள் தமிழ்நாடு சென்று படையுதவி பெற்று ஆட்சிக்கு வந்ததற்கும், தமிழ்நாட்டு வம்சங்கள் இலங்கை மீது படையெடுத்த போது இங்கிருந்த தமிழர்கள் அவர்களுடன் இணைந்து சிங்கள மன்னர்களின் ஆட்சியைக் கைப்பற்றியதற்கும் ஆதாரங்கள் உண்டு. மேலும் அரசியல் குழப்பங்கள் ஏற்பட்டு நாடு பலவீனப்பட்ட சந்தர்ப்பங்களில் இங்கிருந்த தமிழர்கள், சிங்கள மக்களுடன் சேர்ந்து ஆட்சியாளர்களைத் தெரிவு செய்ததற்கும், ஆள்புல விஸ்தரிப்பிற்காக நடந்த போராட்டங்களில் சிங்கள மன்னர்களின் பக்கத்தில் தமிழ்ப்படைவீரர்களும், தமிழ் மன்னர்களின் பக்கத்தில் சிங்களப் படைவீரர்களும் இருந்து ஆட்சியதிகாரத்திற்காகப் போரிட்டதற்கும் ஆதாரங்கள் காணப்படுகின்றன.

ஆனால் கி.மு. 3ஆம் நூற்றாண்டில் இலங்கைக்கு பௌத்தமதம் பரவிய போது கூடவே அம்மதத்தையும், அம்மதத்தை பின்பற்றிய மக்களின் வரலாற்றையும் வாய்மொழியாகப் பேணும் மரபு அறிமுகப்படுத்தப்பட்டது.

அவ்வரலாற்று மரபை அடிப்படையாகக் கொண்டு கி.பி. 4ஆம் நூற்றாண்டில் பாளி மொழியில் எழுதப்பட்ட தீபவம்சமும், கி.பி 6ஆம் நூற்றாண்டில் எழுதப்பட்ட மகாவம்சமும் இலங்கையில் வாழ்ந்த தொடக்ககால சமூகமாக சிங்கள மக்களைக் குறிப்பிடுகின்றன. இவர்கள் கி.மு. 6ஆம் நூற்றாண்டில் வட இந்தியாவிலிருந்து விஜயன் தலைமையில் வந்து குடியேறிய மக்களின் வழித்தோன்றல்கள் எனவும் இவர்களின் வருகையுடனேயே இலங்கையில் மனித வரலாறு தோன்றியதாகவும் விபரிக்கின்றன (Geiger, Mahavamsa, 1950, pp. 51-55). ஆனால் தமிழ் சமூகத்தினரை தென்னிந்தியாவிலிருந்து அவ்வப்போது வந்துபோன வர்த்தகர்கள், படையெடுப்பாளர்கள் என்போரின் வழித்தோன்றல்கள் எனக் கூறுகின்றன (Geiger, Mahavamsa, 1950, pp. 51- 55). இப்பாளி, சிங்கள இலக்கியங்களை அடிப்படையாகக் கொண்டு ஆராய்ந்த பல சிங்கள வரலாற்றாசிரியர்களும் தமிழ் - சிங்கள சமூகத்திடம் நிலவிய நல்லுறவுகளை ஆராய்வதில் அக்கறை காட்டுவதை விட, தமிழ் - சிங்கள மக்களுக்கு இடையிலான ஆட்சி உரிமைக்கான போராட்டங்களை, ஆதிக்கப்போராட்டங்களை இனப்போராட்டங்களாகச் சித்தரிப்பதிலேயே அதிக அக்கறை காட்டி வந்துள்ளனர். ஆனால் அண்மைக்காலங்களில் மேற்கொள்ளப்பட்டுள்ள தொல்லியல் ஆய்வுகள் இற்றைக்கு 28000 ஆண்டுகளுக்கு முன்னரே ஓரளவு நாகரிகமுடைய மக்கள் மலைநாடு தொட்டு தாழ்நிலப்பகுதி வரை வாழ்ந்துள்ளனர் என்பதையும் இன்றைய தமிழ் - சிங்கள சமூகத்தின் மூதாதையினர் இந்தியாவிலிருந்து குறிப்பாக தென்னிந்தியாவின் தென்பகுதியில் இருந்து குடியேறிய ஒரே பண்பாட்டைக் கொண்ட மக்கள் என்பதையும் நிரூபித்துள்ளன.

இன்று சிங்களவர்கள் சிங்கள மொழி பேசுவர்களாகவும் பௌத்தத்தை கடைப்பிடிப்பவர்களாகவும், தமிழர்கள் தமிழ் மொழி பேசுவர்களாகவும் இந்து மதத்தை கடைப்பிடிப்பவர்களாகவும் இருப்பதைக் கொண்டு முற்பட்ட காலங்களிலும் அவ்வாறே இம்மக்கள் வாழ்ந்துள்ளனர் என்ற தப்பான கருத்துக்கள் முன்வைக்கப்பட்டுள்ளன. ஆனால் சிங்கள மன்னர்கள்

இந்து மதத்தை ஆதரித்ததற்கும் தமிழ் மொழியில் கல்வெட்டுக்களை வெளியிட்டதற்கும் தமிழ் மன்னர்கள் பௌத்த மதத்தை ஆதரித்து கல்வெட்டுக்களை வெளியிட்டதற்கும் ஆதாரங்கள் உள்ளன. எனவே வரலாற்றுத் தொடக்க காலத்தில் இருந்து சிங்கள - தமிழ் சமூகத்தினர் இணைந்து அரசியல், திருமணம், பொருளாதார, பண்பாடு ஆகிய துறைகளில் சிறப்பான சாதனைகள் ஈட்டியுள்ளனர் எனலாம்.

சிங்கள ஆட்சியாளர்கள் பெரும்பாலான காலங்களில் தென்னிந்தியாவில் ஆட்சி புரிந்த பாண்டிய, சோழ, சேர போன்ற தமிழரசுகளுடன் வெவ்வேறு காலகட்டங்களில் கூட்டணி மற்றும் விரோதப்போக்கு ஆகிய இரண்டிலும் உறவுகளை ஏற்படுத்தியிருந்தனர். இதனால் இவ் அரசுகளும்பங்களிடையே அடிக்கடி அரசியல் கூட்டணியும் திருமணமும் நடந்தன. அதனால்தான் 18ஆம் நூற்றாண்டில் ஆங்கிலக் காலனி ஆட்சியாளராக வந்த கொடிரிடன் என்பவர் “சிங்களவர்கள் மொழியால் இந்தோ - ஆரிய மொழியைப் பேசுகின்றனர், மதத்தால் பௌத்தத்தைப் பின்பற்றுகின்றனர், பண்பாட்டாலும் சமூக அமைப்பாலும் தென்னிந்திய முறையைப் பின்பற்றுகின்றனர்” என்று கூறியுள்ளமை குறிப்பிடத்தக்கது.

2 ஆய்வின் நோக்கு

வரலாற்றுக் காலத்திலிருந்தே தமிழ் - சிங்கள சமூகங்களிடையே நல்லுறவு இருந்தது என்பதை வெளிக்கொணர்தல், இன்றைய தமிழ் - சிங்கள சமூகத்தினருக்கும் கடந்தகால இச்சமூகங்களுக்கும் இடையே ஒரு நெருங்கிய திருமண உறவு வெவ்வேறு காலப்பகுதிகளில் நடைபெற்றிருந்தது என்பதை எடுத்துக்காட்டுதல், இன, மத முரண்பாடு தொடர்பான எண்ணப்போக்கு, விரோதமனப்பாங்குகளை நீக்கி ஐக்கியத்தை ஏற்படுத்துதல் என்பன இவ்வாய்வின் பிரதான நோக்கங்களாக உள்ளன.

3 ஆய்வு மூலங்கள்

முதலாம் நிலைத்தரவுகள் என்ற அடிப்படையில் பாளி, சிங்கள, தமிழ் இலக்கியங்கள், பிறநாட்டார் குறிப்புக்கள் மற்றும் தொல்பொருள் மூலாதாரங்கள் என்ற வகையில் தமிழ், சிங்கள கல்வெட்டுக்கள் போன்றன

கையாளப்பட்டுள்ளன. இரண்டாம் நிலைத்தரவுகள் என்ற அடிப்படையில் இவ்வாய்வுத் தலைப்புடன் தொடர்புடைய விடயங்களைத் தரும் நூல்கள், ஆய்வுக் கட்டுரைகள், சஞ்சிகைகள், இணையத்தளக்கட்டுரைகள், நாளிதழ்கள் போன்றவை பயன்படுத்தப்பட்டுள்ளன.

4 ஆய்வின் அணுகுமுறை

முதலாம்நிலைத் தரவுகளான பாளி, சிங்கள இலக்கியங்கள் தரும் தகவல்களோடு தொல்லியற் சான்றுகளையும் ஒப்பிட்டு நோக்கி வரலாற்றுத் தகவல்களை அடிப்படையாகக் கொண்டு உண்மைகளைக் கண்டறியும் வகையில் ஒப்பீட்டாய்வு அணுகுமுறை மற்றும் இவ்வாய்வுத் தலைப்புடன் தொடர்புடைய விடயங்களைத் தரும் சான்றுகளை, முன்னைய ஆய்வுக் கருத்துக்களைப் பரிசீலித்து விபரண ஆய்வு அணுகுமுறையும் பயன்படுத்தப்பட்டுள்ளது.

5 பெறுதல்களும் கலந்துரையாடலும்

திருமணம் என்பது மிக முக்கியமான சமூக மரபாக இருப்பதோடு, அதனுடாக குறிப்பிட்டளவிலான சமூக ஒன்றிணைப்பும் இடம்பெறும். இலங்கையைப் பொறுத்தவரை குறிப்பாக அரச வம்சங்களிடையே இடம்பெற்ற திருமணமானது ஒரே வம்சத்தினரிடையே மட்டுப்படுத்தப்பட்டதாக இருக்கவில்லை. இக்காலங்களில் திருமண உறவுகளைப் பொறுத்தமட்டில் சிங்கள அரச வம்சத்துக்கும், தமிழ் அரச வம்சத்துக்கும் இடையில் பல சந்தர்ப்பங்களில் நடைபெற்றிருந்தது என்றால் இன்று பலருக்கும் வியப்பளிக்கும் விடயமாக இருக்கும். ஏனெனில் இரு சமூகங்களையும் ஒருவருக்கொருவர் விரோதமானவர்களாகவே பலவிடங்களில் பாளி இலக்கியங்களில் குறிப்பிடப்பட்டுள்ளது. ஆனால் தமிழ் - சிங்கள சமூகத்தினரிடையே மொழி, மத, இன வேறுபாடு கடந்த நிலையில் திருமண உறவு நிலைபெற்றிருந்தது என்பதை நிரூபிக்கும் வகையில் வரலாற்று ஆதாரங்கள் காணக்கிடைக்கின்றன.

விஜயன் முதல் கண்டி அரசன் ஸ்ரீவிக்கிரம ராஜசிங்கன் வரை பல அரசர்களும், இளவரசர்களும், அரசிகளும், இளவரசிகளும் வெவ்வேறு காலங்களில் தமிழ் அரச வம்சங்களோடு திருமண ரீதியான உறவுகளை

ஏற்படுத்திக் கொண்டனர். முதலாவதாக விஜயன் லாடா தேசத்திலிருந்து 700 தோழர்களுடன் இலங்கையில் தம்பபண்ணியில் வந்திறங்கி இங்கிருந்த இயக்க குலப்பெண்ணான குவேனியை திருமணம் புரிந்து கொண்டான். தொடர்ந்து விஜயன் தலைமையிலான குழுவினர் இலங்கையில் பல நகரங்களையும், கிராமங்களையும் உருவாக்கினர். இதனால் அந்தப் பகுதிகளை உள்ளடக்கிய ராஜ்ஜியத்துக்கு மன்னனாகும்படி விஜயனை கேட்க, பட்டத்துக்குரிய அரசியாக குவேனியை ஏற்றுக்கொள்ள முடியாது எனக் கூறி, விஜயன் மறுத்து விடுகிறான். “ராஜ குடும்பத்தைச் சேர்ந்த ஒரு இளவரசியை நான் மணந்தால்தான் சிம்மாசனம் ஏறமுடியும்” என்று கூறிய போது, விஜயனின் நண்பர்கள் மதுரைக்கு சென்று பாண்டிய (பாண்டு) மன்னனுக்கு முத்துக்கள், தங்க ஆபரணங்கள் முதலியவற்றை பரிசாக வழங்கி, தங்கள் மன்னான விஜயனுக்கு இளவரசியை மணமுடித்து வைக்குமாறு கேட்டுக்கொண்டனர். இதற்கு பாண்டிய மன்னன் சம்மதித்து பாண்டிய இளவரசியுடன், விஜயனின் 700 நண்பர்களுக்கும் 700 பெண்களை தேர்வு செய்து, அவர்களுடன் 18 வகையான தொழில் தெரிந்த 1000 குடும்பங்களை இலங்கைக்கு அனுப்பி வைத்தார். முதல் மனைவியான குவேனியைத் துரத்திய பின்னர் பாண்டிய ராஜகுமாரியை மணந்து கொண்ட விஜயன், அவளுடன் வந்த 700 பெண்களுக்கும் அமைச்சர்களாக உள்ள தன் நண்பர்களை அவரவர் தகுதிக்கேற்ப மணமுடித்து வைத்ததோடு பதிலாக ஒரு இலட்சம் மதிப்புள்ள முத்துக்களை ஆண்டுதோறும் பாண்டிய மன்னனுக்கு விஜயன் அனுப்பியதாக மகாவம்சம் கூறுகின்றது (Geiger, Mahavamsa, 1950, pp. 49 - 58). இவர்களது சந்ததியினரே இன்று இலங்கையில் வாழ்கின்ற சிங்களவர் என்பது வரலாற்று அறிஞர்களின் கருத்தாகும். விஜயனுடைய வருகையே ஒரு புனைகதை என்பது சில வரலாற்றாசிரியர்களின் வாதமாகும். ஆனால் இவ்விடத்தில் சுட்டிக்காட்டப்பட வேண்டிய விடயம் என்னவெனில், விஜயன் குழுவின் வருகை உண்மையென மகாவம்சத்தின் படி ஏற்றுக்கொண்டால் இவர்களுடைய சந்ததி பாண்டிய நாட்டுத் தமிழ்ப் பெண்கள் உறவு வழியாகவே உருவாகியுள்ளது என்பது தெரியவருகின்றது.

அடுத்து சிங்கள அரசி தமிழர்கள் இருவரை மணமுடித்திருந்தமை குறிப்பிடத்தக்கது. அதாவது அனுலா என்ற அரசியை மணமுடித்து, அரச பதவி பெற்று, ஆட்சி நடத்தியவர்களுள் இருவர் தமிழர் எனக் குறிப்பிடப்பட்டுள்ளனர். இவர்களுள் ஒருவர் வடுக என்பவனாவான். இவன் நகரத் தச்சனாக தொழில் புரிந்தவன் என்றும் இவன் அரசி அனுலாவைத் திருமணம் முடித்து ஓர் ஆண்டும் இரண்டு மாதங்களும் ஆட்சி நடத்தியிருந்தான். ஆனால் அனுலா இவனையும் கொன்று இன்னொருவனை மணம் முடித்தாள் என்றும் ஓர் ஆண்டும் ஒரு மாதமும் சென்ற பின் அவனையும் கொன்று நீலிய என்ற இன்னொரு தமிழனை மணமுடித்து அவனை மன்னமாக ஆள வைத்தாள் என்றும் ஆறு மாதங்களின் பின்னர் அவனையும் கொன்றொழித்தாள் என்றும் பாளி நூல்கள் குறிப்பிட்டுள்ளன. (இந்திரபாலா, 2006, pp. 189 - 190). இலங்கையின் பண்டைய ஆட்சியரிமை முறைமையானது தனது இராணியிலிருந்து பிறந்த மகனுக்கோ அல்லது சகோதரரிடமிருந்து சகோதரனுக்கோ அல்லது சிஸமயங்களில் அவரது சகோதரியின் மகனுக்கோ வழங்கப்பட்டது. இருப்பினும் பெற்றோர் இருவரின் அரச அந்தஸ்தும் முக்கியமானதாகக் கருதப்பட்டது. இந்நிலையில் தமிழ் மன்னர்களாகக் கூறப்படும் வடுக மற்றும் நீலிய ஆகிய இருவரும் முன்னைய தமிழ் மன்னர்களைப் போல் படையெடுப்பாளர்களாக வந்தவர்கள் எனக் கூறாது அனுராதபுரத்தில் வாழ்ந்த தமிழர்கள் என மகாவம்சம் கூறுவதிலிருந்து பேராசிரியர் புஸ்பரட்ணம் குறிப்பிடுவது போல (புஸ்பரட்ணம், 2017, p. 66) இவர்களை சுதேச தமிழ் மன்னர்களாகக் ஏற்றுக்கொள்வதோடு ஆட்சியரிமை முறைக்கு தகுதியுள்ளவர்களாகவும் அந்தஸ்துள்ளவர்களாகவும் இருந்திருக்க முடியும் எனக் கருதமுடிகிறது.

இளநாகனின் பின்னர் அவன் மைந்தன் சந்தமுகசிவ (சந்திரவதன) (44 – 52) ஆட்சி பீடமேறினான். இவன் தமிழாதேவி என்ற தமிழ்ப்பெண்ணை மணந்து பட்டத்தராணியாக்கி 8வருடம் 6மாதம் ஆட்சி நடாத்தினான். இத்தமிழாதேவியே தன் கணவன் இறந்ததன் பின்னர் இசர சமணத்திற்கு (இசுறுமுனியாவில்) ஏற்படுத்திக் கொடுத்த நீர்ப்பாசனத்

திட்டத்தை முன்னெடுத்துச் சென்றாள் என மகாவம்சம் கூறுகின்றது (புஸ்பரட்ணம், 2017, p. 66).

அடுத்து கி.பி.410 – 432 வரை அனுராதபுரத்தில் ஆட்சி புரிந்த மகாநாமன் என்ற இலம்பகர்ண மன்னனும் தமிழ் இளவரசியொருவரை திருமணஞ்செய்து கொண்டான் என குளவம்சத்தில் குறிப்பிடப்பட்டுள்ளது (Geiger, Culvamsa, 1953, pp. 202 - 247). இதனால் இவள் தமிழமகிஷி எனப்பட்டாள் (வேங்கடசாமி, 1976, pp. 43 - 44). இவர்களுக்கு சொத்திசேனன் என்னும் மகன் இருந்தான் (Geiger, Culvamsa, 1953, pp. 202 - 247). இவ்வரசி அனுராதபுர அரசியலில் மிகுந்த செல்வாக்கு மிக்கவராகக் காணப்பட்டிருந்தார். அனுராதபுரத்தில் பாண்டிய வம்சத்தவர் ஆட்சி பெறுவதற்கான வாய்ப்பு இவ்வரசி பாண்டிய வம்சத்தைச் சேர்ந்தவளாக இருந்திருந்தால் ஏற்பட்டிருக்கலாமென இந்திரபாலா கருதுகிறார் (இந்திரபாலா, 2006, p. 205). இதேவேளை மகாநாமமன்னன் தன்னுடைய அண்ணன் உபதிஸ்ஸன் அரசனாக இருந்த காலத்தில் அவனுடைய அரசியுடன் கூடாவொழுக்கம் கொண்டிருந்தான். இதனால் அரசி மன்னனைக் குத்திகொலை செய்தாள். இதனைத்தொடர்ந்து மகாநாமன் அரசனானதோடு அண்ணனுடைய மனைவியை தன்னுடைய பட்டத்து இராணியாக்கினான். இச்சிங்கள பட்டத்து அரசிக்கு சங்கா என்ற பெண் மகள் காணப்பட்டாள் (வேங்கடசாமி, 1976, pp. 43 - 44). இதனால் மன்னனுடைய இறப்பிற்குப் பின்னர் தமிழமகிஷியினுடைய மகன் சொத்திசேனன் இலங்கையில் அரசனானான். ஆனால் சொத்திசேனன் முடிசூடிய அதே நாளில் அவனுடைய மாற்றாந்தாயின் மகளான சங்கா என்பவளால் கொலை செய்யப்பட்டிருந்தமை குறிப்பிடத்தக்கது.

அநுராதபுர இராசதானி காலத்தை தொடர்ந்து இலங்கை வரலாற்றில் வேறெந்த காலப்பகுதியிலும் நடைபெறாதளவிற்கு பொலநறுவை இராசதானி காலப்பகுதியில் சிங்கள மற்றும் தமிழ் வம்சங்களுக்கிடையில் மிக நெருக்கமான அன்னியோனியமான உறவுகள் நிலவியுள்ளது. சுமார் 77ஆண்டுகள் (கி.பி 993-1070) இலங்கையின் பெரும் பகுதியின் ஆதிக்கத்தை நிலைநாட்டியிருந்த சோழர்களை, இந்த நாட்டில் இருந்து அகற்றி மீண்டும் சிங்கள ஆட்சியாளர்களின் ஆதிக்கத்தை நிலைநாட்டிய மன்னனாக முதலாம் விஜயபாகு காணப்படுகின்றான்.

இவன் ஆட்சிக்காலத்தில் இருந்துதான் தமிழ் - சிங்கள மக்களிடையே முன்னரைக் காட்டிலும் ஒற்றுமையும் நல்லுறவும் மேலோங்கிக் காணப்பட்டது. இதனால்தான் பொலன்னறுவைக்காலம் இலங்கை வரலாற்றில் பல்லினப்பண்பாட்டின் பொற்காலம் எனக் குறிப்பிடப்படுகின்றது. அவற்றுள் சோழராட்சிக்குப் பின்னரான பொலன்னறுவை அரசில் தமிழ் - சிங்கள நல்லுறவின் உச்சமாக விளங்குவது தமிழ் - சிங்கள அரச வம்சங்களிடையே நடைபெற்ற திருமண உறவுகள் ஆகும். முதலாம் விஜயபாகு சோழரை வெற்றி கொண்டதன் மூலம் வரலாற்றில் சிங்கள இனத்தின் விடுதலை வீரனாகவே போற்றப்படுகின்றான். ஆனால் இலங்கையில் ஆட்சி இழந்த சோழ மன்னன் குலோத்துங்கன் தமது வீழ்ச்சியைப் பொருட்படுத்தாது வெற்றி பெற்ற விஜயபாகுவின் சகோதரியான மித்தாவை தனக்கு மணமுடித்து தரும்படி பொலன்னறுவை அரண்மனைக்கு தூதனுப்பினான். இது தமிழ் - சிங்கள அரச வம்சங்களுக்கு இடையிலான திருமண உறவுகளுக்கு அரசியல் ஆதிக்கப்போட்டி அல்லது ஆள்புலப் போட்டி ஒரு தடையாக இருக்கவில்லை என்பதைக் காட்டுகின்றது. ஆயினும் வரலாற்று அறிஞர்களில் ஒரு சாரார் இத்திருமண உறவின் உள்நோக்கம் தென்னிந்தியாவில் சாளுக்கியரின் எழுச்சியால் வீழ்ச்சியடைந்து கொண்டிருந்த சோழர்கள் அதை நிவர்த்தி செய்வதற்கு சிங்கள அரசுடன் மேற்கொண்ட இராஜதந்திர நடவடிக்கையாகவும் இருக்கலாம் எனவும் கருதுகின்றனர் (அமரதாஸ, 2014, p. 191).

இந்நிலையில் குலோத்துங்க மன்னனின் கோரிக்கையை நிராகரித்த முதலாம் விஜயபாகு தனது சகோதரியான மித்தாவை இன்னொரு தமிழ் அரச வம்சமான பாண்டிய வம்சத்து இளவரசனுக்கு மணமுடித்து வைத்தான். இது சோழமுடன் கொண்டிருந்த இனரீதியான முரண்பாட்டினால் ஏற்பட்டதாகக் கூறமுடியாது. இதற்கான காரணத்தை வரலாற்றிற்கு அமரதாஸ லியனகமகே:

“அக்கால அரச பரம்பரையிடையே திருமண உறவுகளை மேற்கொள்ளும் போது சூரிய வம்சம், சந்திர வம்சம் என்ற வர்க்க வேறுபாடு பேணப்பட்டது. சூரிய வம்சத்தில் திருமண உறவு வைத்துக் கொள்வது அக்கால சிங்கள

மன்னர்களின் வழக்கமாக இருக்கவில்லை. ஆனால் பாண்டியர் சந்திர வம்சத்தைச் சேர்ந்தவர்கள் என்றபடியால் விஜயபாகு மன்னன் தங்கையை பாண்டிய வம்சத்தில் திருமணம் செய்து வைத்தான்” எனக் குறிப்பிடுகின்றார். அத்தோடு சோழரின் பரமவிரோதிகளான பாண்டியர்களுடன் நட்புறவோடு நடந்து கொள்வது சிங்கள மன்னர்களின் வழக்கமாக இருந்தபடியால் அத்திருமணம் இந்த அடிப்படையிலும் நிகழ்ந்திருக்கலாம் எனக் கூறுகின்றார் (அமரதாஸு, 2014, p. 35).

இக்காரணம் ஏற்றுக்கொள்ளத்தக்கதாக உள்ளது. ஆனால் முதலாவது காரணம் பொருத்தமாகத் தோன்றவில்லை. ஏனெனில் முதலாம் விஜயபாகு முன்னர் சோழ அரசனுக்கு சகோதரியை மணமுடித்துக் கொடுக்க மறுத்த போதும் சிறிது காலத்தின் பின்னர் மருமகனுக்கு சோழ இளவரசியை மணமுடித்து கொடுத்துள்ளார். இங்கு எவ்வாறு சூரிய வம்சத்திற்கும் சந்திர வம்சத்திற்கும் இடையில் திருமணம் நடைபெற்றது என்ற கேள்வி எழுகிறது. இந்நிலையில் இந்திரபாலா குறிப்பிடும் போது “சோழ வம்சத்துடன் நடந்த போராட்டத்தின் பின்னர் அவ்வம்சத்துடன் நெருங்கிய உறவை ஏற்படுத்திக் கொள்ள இலங்கை மன்னன் விரும்பவில்லை போலும். அதற்குப் பதிலாக இன்னொரு தமிழ் வம்சத்துடன் அதாவது பாண்டிய வம்சத்துடன் திருமண உறவை வைத்துக் கொள்ள எண்ணம் கொண்டிருக்கலாம் எனவும், விஜயபாகு பாண்டியருடன் கொண்டிருந்த உறவு மேலும் பாண்டியர் செல்வாக்கை வளர்க்க உதவியதன் மூலம் சோழரைக் கட்டுப்படுத்தும் நோக்கம் நிறைவேற்றப்பட்டிருக்கலாம் எனவும் குறிப்பிட்டுள்ளார் (இந்திரபாலா.கா 2006 : 287). இக்காரணிகளை மதிப்பிட்டு நோக்கும் போது முதலாம் விஜயபாகு மன்னன் சோழருக்கு எதிராக பாண்டிய இராச்சியத்துடன் அரசியல், திருமண உறவுகளை பேணுவதை தன்னுடைய வெளியுறவுக் கொள்கையாக கடைப்பிடித்தமை மூலம் சோழரைத் தனிமைப்படுத்துவதும் தனது இராச்சியத்தைப் பாதுகாத்து கொள்வதுமே முக்கிய நோக்கங்களாக இருந்திருக்கலாம்.

ஆனால் காலப்போக்கில் முதலாம் விஜயபாகு சோழருக்கெதிரான தன்னுடைய கொள்கையை மாற்றி மருமகனான வீரப்பெருமாளிற்கு குலோத்துங்கனின் மகனான சுந்தமல்லி ஆழ்வாரை திருமணம் செய்து வைத்தான். சுந்தமல்லி ஆழ்வாரை “வீரப்பெருமான் நம்பிராட்டியார், கொலோத்துங்க சோழ தேவர் திருமகனார்” என இலங்கையிலுள்ள புதுமுத்தாவைச் சாசனம் I குறிப்பிடுகிறது. இச்சாசன வாசகத்தின் ஊடாக சுந்தமல்லியாழ்வார் தமிழ் அரச குடும்பத்தவர் என்பது தெளிவாகிறது. ஏனெனில் சாசனத்தில் வரும் ஆழ்வார், பிராட்டி போன்ற பதங்கள் இறைவன், அரசன், உயர்நிலையிலுள்ளோரைக் குறிக்கும் பதங்களாகும். சூளவம்சம் முதலாம் மானாபரணன் வீரபாகு என்ற பெயரைப் பெற்றிருந்ததாகவும் இம்மன்னனின் தந்தை ஒரு பாண்டிய இளவரசன் எனவும் குறிப்பிட்டுள்ளது. எனவே வீரபாகு(மானாபரணன்) தமிழ் இளவரசனின் மகன் என்பது புலனாகிறது. மேலும் புதுமுத்தாவைச் சாசனத்தில் எழுதப்பட்டுள்ள பெருமான் என்பது அரசரை, இளவரசரைக் குறிப்பதால் சுந்தமல்லி ஆழ்வார் அரசகுடும்பத்தைச் சேர்ந்தவன் என்பதும் அவருடைய கணவன் வீரப்பெருமான் இளவரசனாக இலங்கையின் ஒரு பகுதியை ஆட்சி புரிந்துள்ளான் என்பதையும் அறிந்து கொள்ள முடிகிறது. சாசனத்தில் குறிப்பிடப்படும் மாகலப்பிரதேசத்தில் உள்ள விக்किரமசலாமேகபுரமும், விக்किரமசலாமேக ஈஸ்வரமும் தக்கிண தேசத்தில் உள்ளமையால், தக்கிணதேச ஆட்சியாளனாக வீரபாகு(மானாபரணன்) இருந்துள்ளமை உறுதிப்படுத்தப்படுகிறது.

இத்தமிழரசி மாகலான விக்किரமசலாமேகபுரத்தில் அமைந்துள்ள விக்किரமசலாமேக ஈஸ்வரம் என்ற கோயிலில் விளக்கெரிப்பதற்கு திருநந்தா விளக்கொன்றும், பத்துக்காசம் தானமாக, சூரியன், சந்திரன் நிலைக்குமளவிற்கு நீடித்து நிரந்தரமாக எரிய வேண்டுமென வழங்கியிருந்ததை மேற்படி சாசனம் குறிப்பிடுகிறது (பத்மநாதன், 2006, p. 306). இதனூடாக இத்தமிழரசி செல்வச்செழிப்பு மிக்கவராக பொலன்னறுவை அரசில் இருந்துள்ளதையும், அரண்மனையில் இந்துசமயம் செல்வாக்குப் பெற்றிருந்ததையும் அறியமுடிகிறது.

அடுத்து பொலன்னறுவை இராசதானி காலத்தில் தமிழ் - சிங்கள அரசு வம்சங்களுக்கிடையே திருமணவுறவு நிலைபெற்றிருந்ததை இன்னொரு கோணத்திலும்

நோக்கலாம். தமிழ் இளவரசனுக்கும் சிங்கள இளவரசியான மித்தாவுக்கும் பிறந்த இளவரசர்கள், முதலாம் விஜயபாகுவக்கும் கலிங்க இளவரசி திரிலோகசுந்தரிக்கும் பிறந்த இளவரசிகளில் மூவரை மணமுடித்திருந்தனர். அவ்வகையில் மானாபரணன் - ரத்னாவலியையும், கீர்த்தி ஸ்ரீ மேகன் - லோகநாதாவையும், ஸ்ரீவல்லபன் - சுகந்தாவையும் மணமுடித்தனர். இங்கு தந்தை வழி உரிமையானது கவனத்தில் கொள்ளப்படுமாயின் சிங்கள ஆட்சியாளான விஜயபாகுவின் இளவரசிகள் தமிழ் வம்சத்தினருடனே திருமண உறவைப் பேணினர் எனலாம்.

இந்நிலையில் பாண்டிய இளவரசனுக்கும் மித்தாவுக்கும் பிறந்த மகனான மானாபரணன் விஜயபாகுவும் திரிலோகசுந்தரிக்கு மகளாகப் பிறந்த ரத்னாவலியும் மேற்கொண்ட திருமணத்தின் மூலம் பிறந்தவனே பொலன்னறுவையை ஆண்ட தலைசிறந்த மன்னர்களில் ஒருவனான முதலாம் பராக்கிரமபாகு ஆவான். எனவே பேரன் வழியில் இவனொரு தமிழ் அரசன். தமிழர்களான சோழர்களை வெற்றி கொண்டு முதலாம் விஜயபாகுவைக் காட்டிலும் முதலாம் பராக்கிரமபாகுவையே குளவம்ச ஆசிரியர் காவியத் தலைவனாகப் பாராட்டியதோடு இலங்கையின் ஆட்சியாளர் என்று தலைவர்களும் மக்களும் ஏகமனதாகப் ஏற்றிருந்தனர். எனவே பொலன்னறுவையில் ஆண்ட மன்னர்களுள் இருவர் மட்டுமே தாய் வழியிலும் தந்தை வழியிலும் சிங்களக் குடும்பத்தைச் சேர்ந்தவர்களாய் இருந்தனர். அவ்விருவர் விஜயபாகுவும் அவன் தம்பி ஜயபாகுவும் ஆவர் (இந்திரபாலா, 2006, p. 291). ஆகவே பொலன்னறுவைக் கால அரசிலே சிங்கள - தமிழ் அரச வம்சங்களுக்கிடையே நெருங்கிய திருமணக்கலப்பு ஏற்பட்டிருந்தது எனலாம். இதேவேளை இக்கால சிங்கள மன்னர்கள் கலிங்க வம்சத்தினருடனும் நெருங்கிய திருமணவுறவுகளைப் பேணியமையும் குறிப்பிடத்தக்கது. இதனாலே பிற்பட்ட பொலன்னறுவைக் காலப்பகுதியில் கலிங்கராட்சி இடம்பெற்றது.

அடுத்து தம்பதெனியா இராசதானியில் ஆட்சி புரிந்த இரண்டாம் பராக்கிரமபாகுவும் சிங்கள - தமிழ் திருமண ஊக்குவிப்புக்களை மேற்கொண்டிருந்தார். “ஐம்புத் தீவிலிருந்து ராஜாவின் மகள்களை நான் இங்கு பரிசாகக் கொண்டு வந்து, அதன் மூலம் அந்நிய

தேசத்தின் பிரபுக்களை உங்கள் உறவினர்களாக ஆக்கியுள்ளேன்” (Geiger, Culvamsa, 1953, pp. 87 - 25) எனக் குறிப்பிட்டுள்ளதனூடாக இக்காலத்திலும் தமிழ் இளவரசிகள் பலர் சிங்கள அரச வம்சத்தினரை மணமுடித்தமை தெரியவருகிறது. எனவே தம்பதெனிய அரச சபைகளில் தமிழ்வம்சத்தினரின் செல்வாக்கு அதிகரித்து இருந்திருக்கும்.

அடுத்து கோட்டை இராசதானி காலப்பகுதியில் முக்கிய ஆட்சியாளனாக விளங்கிய ஆறாம் பராக்கிரமபாகுவின் ஆட்சிக் காலப்பகுதிகளிலும் தமிழ் - சிங்கள வம்சங்களுக்கிடையிலான திருமணவுறவு பேணப்பட்டது. ஸ்ரீஇராகுல தேரரால் எழுதப்பட்ட செல்லஹிணி சந்தேசையில் (பூவை விடுதாது) இது பற்றிய குறிப்புக்கள் உள்ளன. அதாவது ஆறாம் பராக்கிரமபாகு மன்னரின் மகனான லோகநாதா தமிழ் இளவரசனை மணமுடித்து தன்னுடைய பெயரினை உலகுடையதேவி என மாற்றினான் எனவும் இவர்களுக்கு ஆண்மகவை வேண்டி இத்தாது இலக்கியம் பாடப்பட்டதாக குறிப்பிடப்பட்டுள்ளது (ஜயசிங்க, 2009, p. 34). இவர்களுக்கு குழந்தைகள் இல்லாமையினால் ஆறாம் பராக்கிரமபாகு தன்னுடைய தமிழ்ப் படைத்தளபதியாகிய பனிக்கலவன் என்பவரின் புதல்வனான செம்பகப்பெருமாள் எனப்படும் சபல்குமாரயாவை வளர்ப்பு மகனாக வளர்த்தான். இச்சபல்குமாரவின் தாயார் அதாவது படைத்தளபதி பனிக்கலவனின் மனைவி ஒரு சிங்களப் பெண் என்பது குறிப்பிடத்தக்கது (சரத், 2000, p. 33). நீண்டகாலம் குழந்தையற்றிருந்த ஆறாம் பராக்கிரமபாகுவின் மகளுக்கு ஜெயவீரபராக்கிரமபாகு என்னும் ஆண்வாரிசு பிறந்ததால், மன்னர் தனக்குப் பின்னர் கோட்டை இராசதானியின் அரசரிமையை பேரனுக்கு வழங்குவதற்குத் தடையாக வளர்ப்பு மகன் செம்பகப்பெருமாள் இருக்கக் கூடாதெனக் கருதியே அவனை யாழ்ப்பாண இராச்சியம் மீது படையெடுக்க வைத்து அங்கு ஆட்சியாளனாக்கினான் எனக் கூறப்படுகின்றது. எனவே கோட்டை இராசதானிக் காலத்திலும் கலப்புத் திருமணங்கள் மேற்கொள்ளப்பட்டமையைக் காணமுடிகிறது.

கண்டிய இராச்சிய காலப்பகுதிகளில் சிம்மாசனத்தைப் பெற்றுக் கொள்ளவும், கலகக்காரர்களின் சக்தியைத் தணிப்பதற்காகவும், பிரபுக்கள் வகுப்பினருடன் இணைந்து கொள்ள விரும்பாமையினாலும், இக்காலப்பகுதியில் பொருத்தமான அரச குடும்பங்கள்

இல்லாமையினாலும் கண்டி மன்னர்கள் மதுரையிலிருந்து இளவரசிகளை வரவழைத்து திருமணம் முடித்தனர். அவ்வகையில் முதலாம் விமலதர்மசூரியன் மதுரையிலிருந்து தமிழ் இளவரசியை வரவழைத்து மணமுடித்தான். ஏற்கனவே கண்டி மன்னர்களுக்கும் நாயக்க ஆட்சியாளர்களுக்கும் இடையே நெருக்கமான தொடர்பு இருந்தது. இதனால் விமலதர்மசூரியன் போர்த்துகீசியருக்கு எதிராக தஞ்சை-மதுரை பகுதியில் இருந்து இராணுவ உதவியைப் பெற்றிருந்தான் (Queyroz, 1930, pp. 535 - 536). இத்தகைய இராணுவ உதவியும் திருமணக் கூட்டணிகளுக்கு வழிவகுத்திருக்கலாம்.

அடுத்து செனரத்தின் மகன் இரண்டாம் இராஜசிங்க மன்னனும் மதுரையிலிருந்து தமிழ் இளவரசிகளை வரவழைத்து திருமணம் முடித்ததாகக் கூறப்படுகிறது. றொபேர்ட் றொக்ஸ் குறிப்பிடும்போது “ராஜாவின் சரியான மற்றும் சட்டபூர்வமான ராணி ஒரு மலபார்” எனக் குறிப்பிட்டுள்ளார். மன்னர் தன்னுடைய இரண்டாம் மனைவியாக கண்டியப்பெண்ணை திருமணம் செய்து அவளுக்கு நிலங்களும் செல்வமும் கொடுத்த போதும் மதுரை இளவரசிக்கே ராணிப் பதவியும் அந்தஸ்தும் வழங்கினார். தமிழ் ராணிக்கு பிறந்த இரண்டாம் விமலதர்மசூரியன் அடுத்து கண்டிய அரியணையில் ஏறினார். இவரும் தனது தந்தையின் முன்மாதிரியைப் பின்பற்றி தனது தலைமை ராணியாக ஒரு மதுரை இளவரசியை எடுத்துக் கொண்டார். கி.பி 1707இல் அவர் இறந்தபோது, அவரது பதினேழு வயது மகன் ஸ்ரீ வீரபராக்கிரம நரேந்திரசிங்கன் அரியணையில் ஏறினார். இவரே கண்டிய இராச்சியத்தின் கடைசி சிங்கள மன்னன் ஆவார். இவரும் மதுரையிலிருந்தே இளவரசியை வரவழைத்து மணமுடித்தார். இவ்வாறு பதினேழாம் மற்றும் பதினெட்டாம் நூற்றாண்டுகளில் கண்டிய மன்னர்கள் மதுரையிலிருந்து தமிழ் அரசிகள் அல்லது இளவரசிகளைப் பெறுவது கொள்கை விடயமாக மாறியதால் 18ஆம் நூற்றாண்டின் நடுப்பகுதியில் கண்டிய அரசசபை நாயக்கர் கைகளுக்கு மாறியது.

ஸ்ரீ வீரபராக்கிரம நரேந்திரசிங்க பிரபுக்களுடன் கலக்காத தூய அரச வாரிசை உருவாக்க வேண்டி, கலப்பு வம்சாவளியைச் சேர்ந்த இலங்கையின் அரச பணிப்பெண்களைப் புறக்கணித்து, மதுரை மன்னரின் மகளை அழைத்தார் என சிங்கள கவிதை மந்தரம்புரா

புவதா குறிப்பிட்டுள்ளது (Lankananda, 1958, pp. 433 - 436). ஆனால் அவ்வரசியினால் மன்னருக்கு குழந்தைகள் இல்லாமையின் விளைவாக பிட்டி நாயக்கரின் மகனும் அரசியின் சகோதரருமான ஸ்ரீ விஜய ராஜசிங்கன் கி.பி. 1739இல் கண்டிய சிம்மாசனத்தில் ஏறி நாயக்கர் வம்சத்தை நிறுவினார்.

இவரும் தென்னிந்தியாவில் உள்ள தனது உறவினர்களிடமிருந்து ஒரு அரசியை பெற்றுக்கொள்ளும் முகமாக கி.பி. 1739இல் மதுரைக்கு தூதுவர்களை அனுப்பி மதுரை இளவரசியை வரவழைத்து மணம் புரிந்தார். இவரைத்தொடர்ந்து கீர்த்தி ஸ்ரீராஜசிங்கன் கி.பி. 1747இல் அரியணை ஏறினார். இவர் மதுரையைச் சேர்ந்த நான்கு இளவரசிகளை மணந்தார் எனக் கூறப்படுகிறது. (Dewaraja, 1974). ஆனால் இவருடைய பட்டதாசிக்கு வாரிசு இல்லாதபோதும் இரண்டாம் மனைவியான மாம்பிட்டியே திசாவையின் மகன் யக்கடயொலிக்கு இரண்டு மகன்களும் ஆறு மகன்களும் இருந்தனர். ஆனால் யக்கடயொலி ஒருபோதும் மகேசி அல்லது ராணி பதவிக்கு உயர்த்தப்படவில்லை. இதன் விளைவாக கி.பி. 1781இல் கீர்த்தி ஸ்ரீராஜசிங்கன் இறந்தபோது, நரேன்பா நாயக்கரின் இரண்டாவது மகன் இராஜாதி ராஜசிங்கன் அரியணையில் ஏறினார். இவரும் மதுரை நாட்டைச் சேர்ந்த பல இளவரசிகளை மணந்தார். ஆனால் குழந்தை இல்லாமல் இறந்தார் (Dewaraja, 1974). இறுதியில் கண்டி இராச்சியத்தின் நாயக்க வம்சத்தின் கடைசி மன்னனாக ஸ்ரீவிக்ரம ராஜசிங்கன் கி.பி. 1798இல் ஆட்சியைப் பெற்றுக்கொண்டார். இவருடைய ஆட்சியுடன் பிரித்தானியர் கண்டி இராசதானியைக் கைப்பற்றிக் கொண்டனர்.

இதேவேளை கண்டி அரசர்கள் யாழ்ப்பாணத் தமிழரசர்களுடனும் திருமண உறவை ஏற்படுத்தியிருந்தனர். குறிப்பாக கண்டிய ஆட்சியாளனாக விளங்கிய செனரத் தன்னுடைய இரண்டு மகன்களுக்கு யாழ்ப்பாண அரசகுமாரிகளை மணமுடிப்பதற்கு முயற்சித்தான். இவ்வேளை யாழ்ப்பாண இராச்சியத்தில் போர்த்துகேயருடைய மேலாதிக்கம் காணப்பட்டதால் அவர்களுடாகவே இம்முயற்சியை மேற்கொண்டான். அவ்வகையில் போர்த்துகேயருக்கு 4000 பதக்கு வழங்குவதாக

கத்தோலிக்க மதகுரு மூலம் தூது அனுப்பினான். ஆனால் போர்த்துக்கேய அரசு இத்திருமண உறவு ஊடாக சென்றத் யாழ்ப்பாண இராச்சியம் மீது ஆதிக்கம் செலுத்த முயலாம் எனக் கருதி மறுப்புத் தெரிவித்து விட்டது. இந்நிலையில் கண்டி மன்னன் தஞ்சாவூர் நாயக்கர்களது உதவியை நாடி, சங்கிலி மன்னது கலகத்தினால் சின்னமீகப்பிள்ளையிடம் பாதுகாப்பின் பொருட்டு ஒப்படைக்கப்பட்டிருந்த அரசிளங்குமாரிகளை தனது இரு மகன்களுக்கும் மணமுடித்து வைத்தான். இம்மணவுறவு மூலம் போர்த்துக்கேயர் அஞ்சியது போன்று யாழ்ப்பாண அரசு தனக்குரியது என்ற அடிப்படையில், கண்டிய மன்னன் கி.பி. 1628, 1629 காலப்பகுதிகளில் யாழ்ப்பாண அரசு மீது போர்த்துக்கேயருக்கு எதிராக படையெடுத்திருந்தமை குறிப்பிடத்தக்கது (Abeyasinghe & Devaraja, 1995, p. 156). இவ்வாறு கண்டிய மன்னர்கள் தமிழ் வம்சத்துடன் கொண்ட திருமண அடிப்படையிலான கூட்டணி தமிழ்ச்சமூகத்தின் அதிகரிப்பு மற்றும் பண்பாட்டுத் தாக்கங்களுக்கான கதவைத் திறந்தது. எனவே பதினெட்டாம் நூற்றாண்டில் நாயக்க வம்ச காலத்தில் கண்டிய அரண்மனையில் தமிழ்ப்பண்பாடு உச்சக்கட்டத்தை அடைந்தது எனக் கூறலாம்.

6 முடிவுரை

ஆகவே இவ்வாய்வின் ஊடாக இலங்கையில் கணிசமான சிங்கள அரசர்கள் - தமிழ் இளவரசிகளையும், தமிழ் அரசர்கள் - சிங்கள அரசிகளையும் பல்வேறு காலகட்டங்களில் திருமணம் புரிந்து இரண்டு வம்சங்களுக்கும் இடையில் நல்லுறவை

வளர்த்தெடுத்ததை அறியமுடிகிறது. பெரும்பாலும் சிங்கள அரசர்கள் பல பெண்களை மணமுடித்திருந்தாலும் தமிழ் வம்ச அரசிகளையே தமது பட்டத்தராணிகளாகக் கொண்டிருந்ததையும் காணமுடிகிறது. இதனால் சிலநேரங்களில் இவர்களின் வாரிசுகள் சிம்மாசத்திற்காகப் போரிட்டமை சுட்டிக்காட்டத்தக்கது. இந்நிலையில் இரு அரச வம்சத்தினருக்கும் இடையில் நடைபெற்ற திருமண உறவின் விளைவாக இலங்கை அரசசபைகளில் இந்துமதமும் பௌத்தமும் பக்கம் பக்கமாக வளர்ச்சி பெற்றதோடு தமிழ் - சிங்கள மொழிகள் ஆட்சி மொழியாக ஏற்றுக்கொள்ளப்பட்டு இம்மொழிகளின் வளர்ச்சிக்கு இரு சமூகத்தினரும் தங்களது பங்களிப்புக்களை வழங்கியிருந்ததையும், அரச சபைகளில் தமிழர்களின் எண்ணிக்கை அதிகரித்ததோடு, இவ்விரு வம்சத்தின் கலையம்சங்களும் கலப்புற்று வளர்ச்சி பெற்றுக்கொண்டதையும் நோக்கமுடிகிறது. எனவே பாளி, சிங்கள இலக்கியங்கள் குறிப்பிடுவது போன்று தமிழ் - சிங்கள வம்சங்களுக்கிடையில் முரண்பாடு உடைய வரலாறு நிலவவில்லை, மாறாக இணைந்த வரலாறே நிலவியது. இவர்களுக்கு இடையில் சிலநேரங்களில் இடம்பெற்ற போராட்டங்கள் சிம்மாசனத்தை தக்க வைக்கும் அரசியல் ஆதிக்கப் போராட்டங்களாகத்தான் இடம்பெற்றிருந்தது. எனவே தமிழ் - சிங்கள வம்சங்களுக்கு இடையில் நடைபெற்ற திருமண உறவும், அவற்றின் விளைவுகளும் இலங்கையில் பல்லினப்பண்பாட்டினை வளர்த்தெடுத்தது எனலாம்.

உசாத்துணை நூல்கள்

- Abeyasinghe, T. B., & Devaraja, L. S. (1995). *The Kingdom of Kandy: Foundations and foreign relations to 1638*. In K. M. Silva (Ed.), *History of Sri Lanka* (Vol. II). Dehiwala: Sridevi Printers.
- Dewaraja, L. S. (1974). *Matrimonial Alliances between Tamilnad and the Sinhalese Royal Family. Fourth International Tamil Conference Seminar, Jaffna*. Retrieved from https://tamilnation.org/conferences/tamil_studies/iatr74_jaffna/lor na
- Geiger, W. (Ed.). (1950). *Mahavamsa*. Colombo: Ceylon Government Information Department.
- Geiger, W. (Ed.). (1953). *Culvamsa*. Colombo: Ceylon Government Information Department.

Lankananda, L. (Ed.). (1958). *Madarampura Puvata*. Ceylon.

Queyroz, F. d. (1930). *Temporal and Spiritual Conquest of Ceylon* (Vol. II). (S. F. Perera, Trans.) Colombo: A. C. Richards, Acting Government Printer, Ceylon.

அமரதாஸ், லி. க. (2014). *அரசியல் வரலாறு கி. பி. 1017- 1270, இலங்கை வரலாறு பொலனறுவை யுகம் - கோட்டை யுகம்*. கொழும்பு: கல்வி வெளியீட்டுத் திணைக்களம்.

இந்திரபாலா, கா. (2006). *இலங்கையில் தமிழர் ஓர் இனக்குழு ஆதிக்கம் பெற்ற வரலாறு(கி. மு. 300 - கி. பி. 1200)*. கொழும்பு: குமரன் புத்தக இல்லம்.

சரத், ல. (2000). *புராதன இலங்கையின் தமிழ் சிங்கள உறவுகள்*. (றம்சியா பாருக், Trans.) நுகேகொட: இனத்துவ தொடர்பியல் அமைப்பு.

பத்மநாதன், சி. (2006). *இலங்கைத் தமிழ்ச் சாசனங்கள்* (Vol. 2). கொழும்பு: குமரன் புத்தக இல்லம்.

புஸ்பரட்ணம், ப. (2017). *இலங்கைத்தமிழர் ஒரு சுருக்க வரலாறு*. மலேசியா: தமிழ்க் கல்விச்சேவை, சுவிற்சலாந்து.

வேங்கடசாமி, ம. சீ. (1976). *களப்பிரர் ஆட்சியில் தமிழகம்*. சென்னை: மக்கள் வெளியீடு.

ஜயசிங்க, என். ஏ. (2009). சிங்கள தூதுக் காவியங்களின் தோற்றமும் வளர்ச்சியும். *பண்பாடு, மலர் 18* (இதழ் 1), pp. 33 - 36.

Influence of transformational and transactional leadership on employee performance

Thaneswary Raveendran

Department of Human Resources Management, Faculty of Management Studies and Commerce, University of Jaffna, Sri Lanka

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Abstract

This study aims to investigate the effect of transformational and transactional leadership styles on employees' job performance among employees in the public sector. An explanatory study was conducted with a survey research strategy in a cross-sectional time horizon. A sample of 423 employees working the public sector in the Northern Province of Sri Lanka was selected using simple random sampling technique. The study constructs were measured using established instruments. Results revealed that transformational leadership positively impacts employee performance whereas the impact of transactional leadership on employee performance is not significant. Further, the study found that both transformational and transactional leadership positively impact psychological empowerment. The results also revealed that psychological empowerment mediates the impact of both transformational and transactional leadership on employee performance. The study findings give an insight

which is the most appropriate leadership style to use in relevant situations for increased employees' performance. In addition, the study findings emphasize the need for empowering employees to enhance their performance. The public sector organizations will be able to consider the findings of this research for developing leadership programmes in order to enhance appropriate leadership skills.

Keywords: *Employee performance; psychological empowerment; transactional leadership; transformational leadership.*

1 Introduction

Administrators in the public sector have direct dealings with the people in the communities and have the chance to make a real difference to people's lives. Their style of leadership could have a great impact on the employees working under them and thus the quality of service provided to the communities. Leadership research is vital on the grounds that it leads towards identifying more successful leadership

Corresponding author: Dr. T. Raveendran, Department of Human Resources Management, Faculty of Management Studies and Commerce, University of Jaffna, Sri Lanka. e-mail: rthanes@univ.jfn.ac.lk



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approaches and assessment of the current leadership approaches (Barbuto, 2005). Leadership research gives direction regarding the qualities and behaviours of leaders that lead to positive results to organizations as well as employees.

Several researches have attempted to investigate the connections between leadership and employee outcomes, while in Sri Lanka, the work on this subject is unfortunately very limited. This study will attempt to identify the effect of transformational and transactional leadership styles on employee performance in the domain of public sector of the Northern Region of Sri Lanka, while exploring the mediating role of employees' psychological empowerment in the effect of these leadership styles on employee performance.

Public sector plays important role in the development of region in terms of better service to fulfil the needs in the region. If the public sector is not properly managed it could not contribute much to the country's expectations. Therefore, there is a need to manage the human resource towards productivity in the state owned organizations and thus effective leadership becomes vital for improving performance of employees. Thus, this study attempts to investigate the effect of transformational and transactional leadership styles on employees' job performance and the results of the study will give an insight which leadership style is better in improving the performance among employees in the public

sector organizations. This study also attempts to investigate the mediating role of psychological empowerment on the effect of leadership styles on employees' performance.

Even though, the empirical evidences on the association between leadership and employee performance across countries and across industries (Rasool *et al.*, 2015) (Gimuguni *et al.*, 2014), the evidence of the effect of leadership style on employee performance is varied. Chan(2010) also advocates that different styles are needed for different situations. The culture and context could be situational aspects and thus the need for studying the effect of leadership styles on performance in the Sri Lankan context would add knowledge to the existing literature. Particularly, the Sri Lankan public sector has not been given much attention by the previous researchers. Therefore, the current study attempts to identify the appropriate leadership style that can encourage employee performance in the public sector in the Northern Province of Sri Lanka.

2 Research problem

There is a problem of inefficiency of the public service in the Sri Lankan public sector and the public sector employees seem to have less productivity (Wijesiri, 2016). People require the public service to be effective and transparent. Sri Lankans rely on public service to satisfy most of their day to day needs, however, they are increasingly distrustful of the public service. If the managers and leaders

better manage the employees, it is possible to promote productivity of the workforce and to ensure efficient service to the people.

Public enterprises were seen to be inefficient and have inadequate performance, and were burden for the state and for the treasury (Corea, 1988) (Gunaruwan, 2016) reported that inefficiency is a common problem in all Sri Lankan state owned enterprises, across all organizational categories. The inefficiency is partially caused by the employees' performance problems. (Rathnathilaka *et al.*, 2016) have reported that, in Sri Lanka, majority of the public sector employees access social network sites during working time. (Warnakula & Manickam, 2010) also reported the same finding. The trend of access of social media has been increasing due to technological development. To overcome the inefficiency, leaders should play an important role in regulating employee behaviour and performance to ensure high quality public service.

The research problem of the current study is defined as follows.

“Inadequate performance of public sector employees in Sri Lanka”

3 Objective

The objective of the current study is to determine the influence of perceived transformational and transactional leadership styles on employees' performance and the mediating effect of psychological empowerment in the leadership-performance

relationship in public sector organizations in the Northern Province of Sri Lanka. The study would determine which leadership style has more impact on the employees' performance.

4 Research gap

In the Sri Lankan context, there is little evidence of studies which investigated the impact of transformational and transactional leadership styles on various employee outcomes such as employee' performance (Chamika & Gunasekara, 2016), knowledge creation (Athukorala *et al.*, 2016), Union and Organizational Commitment (Dhammika *et al.*, 2013), employees' trust and organizational commitment (Mathotaarachchi, 2013), etc. However, still there is need for studies in the subject of leadership in public service organizations in the Northern Province, where the employees' cultural aspects like values, attitudes and behaviours differ noticeably. Even though (Raveendran, Effect of transformational leadership on organizational commitment through the interaction of psychological empowerment, 2021) surveyed Development Officers working in the Divisional Secretariats and District Secretariat, the study was limited to Jaffna District.

There has been considerable research on leadership in different sectors in various countries (Herbst & Conradie, 2011) (Lopez-Dominguez *et al.*, 2014) (Sani & Maharani, 2012) (Vinger, 2009) (Basham, 2012) (Bolden *et al.*, 2012). However, these studies were conducted in different context where the

cultural aspects such as people's values, attitudes and behaviours differ noticeably. Moreover, previous studies have examined different leadership styles such as authoritative and democratic leadership, people and task oriented leadership and authentic leadership. Hence, there is a need for examining the association between leadership styles and employee performance in the public sector in Sri Lanka.

Therefore, the present study attempts to examine how transformational and transactional leadership styles affect employee performance and, in particular, mediating effect of psychological empowerment in the relationship between the leadership styles and employees' performance in the public sector organizations in the Northern Province of Sri Lanka. The results of the study will identify which leadership style leads to the greatest levels of employee performance in the public sector organizations.

5 Research questions

This research has been designed to address the following questions:

- To what extent perceived transformational and transactional leadership styles impact employee in the public sector in the Northern Province of Sri Lanka?
- Does psychological empowerment mediate the impact of transformational and transactional leadership styles on influence performance?

6 Theoretical underpinnings and hypothesis development

6.1 Concept of Leadership

According to (Cole, 2002), leadership is a dynamic process in which a person influences others to contribute voluntarily to achieve the goals and objectives. According to (Northouse, 2007), leadership is a process whereby an individual influences a group of people to attain a common goal. Jong & Hartog(2007) have mentioned that leadership is a process of influencing others to get desired results. In other words, leadership is the process whereby a person influences others to willingly exert efforts and use the abilities towards accomplishing goals of the group and organization (Nel *et al.*, 2004). Current leadership theories indicate that leadership behaviours can be categorized into two main styles: transformational leadership and transactional leadership (Bass & Avolio, 1997) (Bass & Avolio, 2000).

6.2 Transformational and transactional leadership

Transformational and transactional leadership styles have been adopted for last few decades since Burn's (1978) work on these phenomenon. Both of these styles are important for positive outcomes in organizations (Bass, 1985). Later, in 1999, Bass reported that it is important to promote transformational leadership and demote transactional leadership due to the changes and advancements in the workforce over the last two decades. Transformational leadership inspires people to achieve outstanding results.

It gives workers autonomy over specific jobs and the authority to make decisions once they have been trained. Transformational style of leadership comprises of the components of idealized influence (attributes and behaviour), inspirational motivation, intellectual stimulation and individualized consideration and has been suggested widely as the optimum style for managing change (Avolio *et al*, 1999), (Bass & Avolio, 1997).

Transactional leadership is an exchange process. It is a matter of contingent reinforcement of employees based on performance. It motivates subordinates by appealing to their personal desires, based on instrumental economic transactions. Previous leadership scholars (e.g. (Bass, 1985); (Podsakoff *et al.*, 1990)) have identified contingent reward, which involves leaders clarifying roles and task expectations and providing contingent rewards on the fulfilment of contractual obligations, as the principal behavior to represent transactional leadership because it captures the exchange notion fundamental to transactional leader behavior (Podsakoff *et al.*, 1990), (Bass, 1985) and his associates (Avolio *et al.*, 1999); (Bass & Avolio, 1997); (Hater & Bass, 1988) also hypothesized three behavior dimensions that underlie transactional leadership. They are contingent reward, management by exception-active and management by exception-passive.

Despite plenty of studies has been conducted on leadership all over the world, there are very few studies available in the literature to

understand the association between leaders' leadership styles and employees' organizational commitment and the mediation effect of psychological empowerment in the relationship between transformational leadership style and organizational commitment in the Sri Lankan context. Review of existing literature revealed that only a few studies conducted in the subject of leadership in Sri Lanka. For example, Dhammika *et al.* (2013) examined effects of leadership styles on union and organizational commitment in public sector organizations in Sri Lanka; Raveendran and Gamage(2019) studied the mediating effect of organizational commitment in the effect of transformational leadership on employee performance in the Divisional Secretariats in the Jaffna District. Likewise few other researches on leadership styles and employee outcomes in Sri Lanka context have been reported (Jayakody, 2008) (Kasturi Arachchi, 2011) (Athukorala *et al.*, 2016) (Fernando, 2018). However, the studies on this phenomenon are not adequate to understand the effects of transformational and transactional leadership on employee performance in the Sri Lankan public sector.

6.3 Employee performance

Employee performance is a construct consisting of various work related dimensions. According to Nmadu (2013), employee performance is the degree of accomplishment of tasks that make up an employee's job. The performance is measured against standard set for the employees in terms of accuracy, speed, quality, quantity, etc. In addition, the

behaviours such as attendance, timeliness, morale, efficiency and effectiveness are also considered for determining employee performance levels (Mathis *et al.*, 2009). Researchers attempt to identify the dimensions of employee performance with the aim of managing employee performance at workplace. A widely accepted method of conceptualization of employee performance is the five-factor model of performance (Welbourne *et al.*, 1998). The five factor model captures the employee performance along with five aspects of a job which are essential part of overall performance. The factors are job, career, innovator, team, and organization role. A role is generally defined as the total set of performance responsibilities associated with one's employment (Murphy & Jackson, 1999), cited in (Dhammika, 2013).

6.4 Transformational leadership and employee performance

Previous studies have reported that transformational leadership is positively associated with employees' performance, job satisfaction and commitment (Emery & Barker, 2007) (Walumbwa *et al.*, 2004). The study conducted by Emery and Barker (2007) using a sample of 124 managers and 389 employees from banking and food industries found that employees were more satisfied with transformational style than transactional style. Walumbwa *et al.* (2004) reported that, compared to other styles, transformational leadership style enhances organizational commitment and job satisfaction of employees. They pointed out that the employees working

under transformational leaders tend to have high level of confidence in their capacity to perform their tasks. Moreover, Walumbwa *et al.* (2005) investigated the effect of transformational leadership style on organizational commitment and job satisfaction of employees in Kenya and USA. A sample of 158 participants from Kenya and 189 participants from USA were surveyed in the study and it was found that transformational leadership was positively associated with employees' organizational commitment and job satisfaction in both countries. Even though it was expected that the influence of transformational leadership style would vary between African culture and Western culture, the results showed that the style was equally effective in both cultures. Cavazotte *et al.* (2013) reported that transformational leadership leads to higher levels of task performance and helping behaviours. The same results have been reported in the literature (Jiang *et al.*, 2016) (Sparkling *et al.*, 2016) (Andreani & Petrik, 2016) (Yammarino & Dubinsky, 1994) (Spangler & Braiotta, 1990). The studies conducted in the Sri Lankan context also reported positive effect of transformational leadership on employee performance (Rawashdeh *et al.*, 2020) (Chamika & Gunasekara, 2016) (Karunajeewa, 2018).

Many researchers (e.g. (Emery & Barker, 2007), (Organ, 1998), (Behery, 2008)) reported that transformational leadership style contributes to organizational effectiveness than do

transactional leadership. Transformational leaders demonstrate encouragement, impart confidence, acknowledge competence, encourage innovation and motivate for higher performance. These characteristics bring positive results in employees as well in organizations. However, Tseng and Huang (2009) found that transformational leadership style does not suit to all types of organizations. Based on the review of literature the hypotheses H1 is formulated as follows.

H1: Transformational leadership has a significant positive influence on perceived performance of employees.

6.5 Transactional leadership style and employee performance

The transactional leadership style has been reported to have a positive influence on employee behaviour (Ismail *et al.*, 2010). An empirical study in Yemen, conducted by Ahmad and Gelaidan (2011) found that transactional leadership was more effective than transformational leadership. They suggested that employees working in the public sector in Yemen prefer to work with transactional leaders than with transformational leaders. Moreover, transactional leadership style has been shown to have stronger effect on employee performance and dedication to job (Suryanarayana, 2011). Chaudhry and Javed (2012) found that employees under transactional leaders are highly motivated than the employees under transformational leaders in banking sector of Pakistan. From this evidence, motivation level is high under transactional leadership and thus employees

perform well under this leadership. Likewise, many researchers have reported significant positive relationship between transactional leadership style and employee performance (Pradeep & Prabhu, 2011) (Kehinde & Banjo, 2014) (Tsigu & Rao, 2015) (Gimuguni *et al.*, 2014) (Obiwuru *et al.* 2011) (Muterera, 2012) (Paracha *et al.*, 2012).

Previous researchers have compared the effectiveness of transformational and transactional leadership and showed that in some instances transactional leadership has contributed to organizational performance more than transformational leadership (Deluga, 1998) (Gill, 1998) (Suryanarayana, 2011) (Ahmad & Gelaidan, 2011) (Arham & Muenjohn, 2012). However, some researchers have reported that transactional leadership is negatively related to work performance (Evans, 2005), (Erkutlu, 2008) as well as organizational performance (Behery, 2008) (Emery & Barker, 2007) (Organ, 1998). Most prominent researchers argue that transactional style is necessary in organizations as transformational style (Bass, 1985). This is because transactional leaders were not inclined to motivate employees about the meaning of performance and tasks given to them.

Transactional leadership was found to be more important in the past when the workers were mainly motivated by financial factors (Olanrewaju, 2009). Transactional style also has been reported as an effective style in some organizations. Obiwuru *et al.*(2011) reported

that transactional leadership style increases performance than transformational leadership in small organizations.

Based on the majority empirical evidences, the hypothesis 2 was established as follows.

H2: Transactional leadership has a significant positive influence on perceived performance of employees.

6.6 Psychological empowerment

Grunig (1992) defined empowerment as the symmetrical concept of power, which means collaborating to increase the power of everyone in the organization, to the benefit of everyone in the organization. In contrast, the asymmetrical concept of power involves leaders trying to control and make others dependent on them. Thomas and Velthouse (1990) defined empowerment more broadly as increased intrinsic task motivation manifested in a set of four cognitions reflecting an individual's orientation to his or her work role: meaning, competence, self-determination, and impact.

6.7 Association between transformational leadership style and psychological empowerment

An outcome of transformational leadership is the empowerment of followers (Burns, 1978). Through empowerment, the followers are transformed into effective leaders. Transformational leaders promote psychological empowerment by providing them with autonomy, building their confidence, enhancing their abilities to capitalize on opportunities and promoting their performance (Conger & Kanungo, 1988).

They contribute for the success of the companies and motivate employees to perform extremely well towards the organizational and individual goals (Spreitzer, 1995). Few studies, (Allameh *et al.*, 2012) (Sagnak *et al.*, 2015) have reported that transformational leadership influences psychological empowerment among teachers. Moreover, followers can be empowered by encouragement and positive persuasion from the transformational leader (Boamah *et al.*, 2018). Allameh *et al.* (2012) found that the dimensions of transformational leadership had a significant relationship with psychological empowerment among school teachers.

Fang-guo (2013) examined the association between the variables surveying managers and employees in 144 restaurants in China and found that transformational leadership is correlated with empowerment. By surveying 310 managers in three private information technology organizations in India, (Jha, 2013) reported that there is significant positive relationship between transformational leadership and psychological empowerment. Likewise, several studies (Pradhan *et al.*, 2017) (Suer, 2017) (Martin & Bush, 2006) (Han *et al.*, 2016) (Balaji & Krishnan, 2014) confirmed that transformational leadership and psychological empowerment are significantly correlated.

Based on the literature, the hypotheses H3 was formulated as follows.

H3: Transformational leadership has a significant positive influence on psychological empowerment

6.8 Association between transactional leadership style and psychological empowerment

Gkorezis and Petridou (2008) mentioned that the elements of transactional leadership named information feedback, recognition and financial rewards are positively related to psychological empowerment of followers. Likewise, contingent reward and active management by exception could allow the employees to better assess their competence and impact in influencing organizational outcomes. There are evidences in the literature to support that transactional leadership predicts psychological empowerment (Ma & Jiang, 2018) (Pieterse *et al.*, 2010) (Epitropaki & Martin, 2005) (Spreitzer, 1995). However, an overreliance on contingent reward which is a transactional leadership component will create the perception of a lack of empowerment among employees (Bass & Avolio, 1994) Based on the literature, the following hypothesis was formulated.

H4: Transactional leadership has a significant positive influence on psychological empowerment

6.9 The mediating role of psychological empowerment in the influence of leadership styles on employees' performance

Studies showed that direct effect of leadership on employee performance, and indirect effect of leadership on employee performance through psychological empowerment as an intervening variable. Particularly, researchers have reported that effects of transformational leadership on the performance of followers

are mediated by empowerment (Bartram & Casimir, 2007) (Tung, 2016). Similarly, Epitropaki and Martin (2005) found that transformational leaders can build a perception among employees that they are listened to, and valued as organizational members through empowering them. Few researches have mentioned that organizational leadership influences employee attitudes and behaviors through empowerment (Behling & McFillen, 1996) (Bass, 1999).

There are very few evidences in the literature to support for the argument that subordinates' psychological empowerment mediates the relationship between transactional leadership and employee performance (Wei *et al.*, 2010) (Tung, 2016). Wei *et al.* (2010) surveyed 101 teams, involving 497 team members and 101 team leaders in a large multinational company in China. They found that the influence of transactional leadership on team empowerment climate and creative performance is mediated by psychological empowerment of employees. Ozaralli (2002) mentioned that leaders enhance employee's performance through empowering their team members (Ozaralli, 2002). Following the line of thinking of the previous researchers, the present study hypothesizes the mediating role of psychological empowerment as given below.

H5: Psychological empowerment mediates the influence of transformational leadership on employee performance

H6: Psychological empowerment mediates the influence of transactional leadership on employee performance

quantitative survey method was used in the present study as it provides a cost-effective and efficient way of collecting data from large populations as suggested by Stacks (2010)

7 Methodology

To determine the answers to the research questions and test the hypotheses, a

7.1 Conceptual Framework

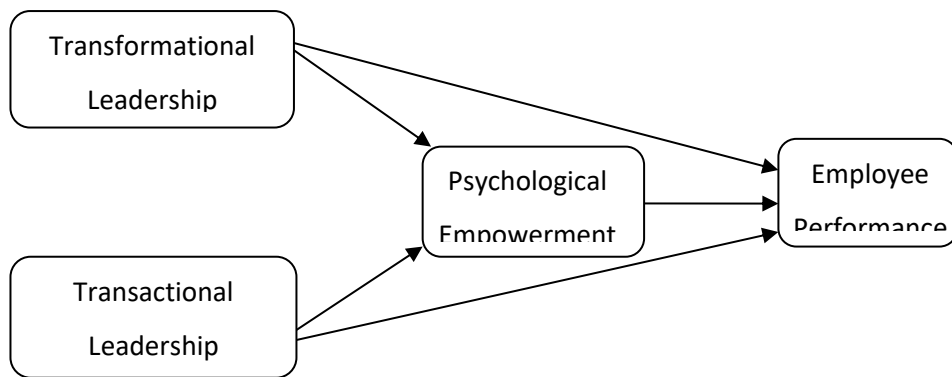


Figure 1 : The conceptual framework

7.2 Operationalization

The concepts and variables taken for the study were operationalized as shown in Table 1.

Table 1 : Operationalization

Concept	Variable	Dimensions	Measure/Instrument
Leadership Styles	Transformational Leadership	<ul style="list-style-type: none"> • Idealized influence (attributes and behaviour) • Inspirational motivation • Intellectual stimulation • Individualized consideration 	Multifactor Leadership Questionnaire (MLQ) Form 5X - Rater form Bass & Avolio (2000)
	Transactional Leadership	<ul style="list-style-type: none"> • Contingent Reward • Active Management-by-exception • Passive Management-by-exception 	
Employees' Performance	Perceived Employees Performance	<ul style="list-style-type: none"> • Job role • Career role • Innovator role • Team role • Organization role 	The Role-Based Performance Scale Welbourne <i>et al.</i> (1998)
Psychological Empowerment	Perceived Empowerment	<ul style="list-style-type: none"> • Meaning • Competence • Self-determination • Impact 	Empowerment scales of Spreitzer (1995)

7.3 Sample

As per the Census of Public and Semi Government Sector Employment in Sri Lanka (2016), the category of organizations come under the public sector include:

- (i) Institutions grouped under Line Ministries;
- (ii) Institutions grouped under Provincial Councils;
- (iii) Institutions grouped under District Secretariats; and
- (iv) Institutions not grouped under a Ministry.

The present study covers the institutions grouped under District Secretariats and the samples were selected from this category. The targeted population for the study is the full-time employees who are employed in the institutions grouped under District Secretariats in the Northern Province of Sri Lanka. A sample of 423 employees was selected based on simple random sampling technique.

7.4 Instruments

The present study employs survey method and the instruments used to measure the study variables are given in Table 1. The instruments were pretested before administering. In the present study, before the actual administration of the questionnaire to the participants, the instruments were pretested with 36 employees generated by convenience sampling to ensure the validity of the instrument. Based on respondents' feedback, the items were reworded or modified to avoid ambiguity and confusion. The content validity of the instruments was examined by the researcher and assured that the survey instruments cover all relevant aspects of the constructs and irrelevant aspects are not included.

8 Analysis and results

Data analysis was conducted using SPSS 21.0 for Windows and AMOS 20.0 software. Confirmatory Factor Analysis was performed to validate the constructs and subsequently, the validated models were integrated in Structural Equation Model (SEM).

Table 2 : *Reliability of scales*

Variable	No. of items	Cronbach's Alpha
Transformational leadership		
Intellectual Stimulation-	4	0.778
Inspirational Motivation-	4	0.752
Individual consideration-	4	0.747
Idealized Influence (attributes)-	4	0.801
Idealized Influence (behavior)-	4	0.800

Transactional Leadership		
Contingent Reward	4	0.766
Management-by-exception (active)	4	0.824
Management-by-exception (passive)	4	0.784
Employee Performance		
Job	4	0.784
Career	4	0.816
Innovator	4	0.892
Team	4	0.814
Organization	4	0.852
Employee Empowerment		
Meaning	3	0.803
Competence	3	0.747
Self-Determination	3	0.880
Impact	3	0.758

Source : Survey data, 2020

8.1 Testing assumptions for factor analysis

The normality was tested by assessing skewness and kurtosis for every item of the study. The values for skewness and kurtosis between -2 and +2 are considered acceptable to confirm that the data are normally distributed (George & Mallery, 2010). Further, SEM using MLE method is rather robust to skewness values greater than acceptable level if the sample size is large. Normally the sample size greater than 200 is considered adequate even though the data distribution is slightly non-normal (Hair *et al.*, 2014). In the current study, the values of skewness and kurtosis fall between -2 and +2 and thus the normality assumption was fulfilled.

In case of multicollinearity, if VIF is below 10 and the corresponding tolerance value is above 0.1, multicollinearity is not a problem for the data (Hair *et al.*, 2014) (Sreejesh *et al.*, 2014).

8.2 Confirmatory Factor Analysis

In CFA for the construct transformational leadership, initially, the items with low factor loading were dropped from the model and the new measurement model was run. After the removal of the items, it was observed that intellectual stimulation and idealized influence-attributes which come under transformational leadership were highly correlated (more than 0.85) and thus the two constructs are redundant or having serious multicollinearity problem. Hence, one of the factors named idealized influence-attributes was removed from the model and the new measurement model was run. All factor loadings were significant at 0.001 level. The redundant pairs were constrained as "free parameter estimate". Consequently, the results show the acceptable goodness of fit values as suggested by Hair *et al.* (2014). The results of CFA and fitness indexes are shown in Table 3..

Table 3 : CFA Results of transformational leadership

			Standardized Estimate	P	AVE	CR	Cronbach's alpha
ID_IN_B4	<---	ID_IN_B	.662		0.514	0.795	0.800
ID_IN_B3	<---	ID_IN_B	.666	***			
ID_IN_B2	<---	ID_IN_B	.713	***			
ID_IN_B1	<---	ID_IN_B	.815	***			
IN_ST4	<---	IN_ST	.672		0.522	0.612	0.656
IN_ST2	<---	IN_ST	.628	***			
IN_ST1	<---	IN_ST	.867	***			
IN_CN4	<---	IN_CN	.847		0.826	0.875	0.900
IN_CN1	<---	IN_CN	.967	***			
IN_MO2	<---	IN_MO	.743		0.625	0.744	0.766
IN_MO1	<---	IN_MO	.835	***			

Fitness indexes: CMIN/DF=3.03, GFI=.93, AGFI=.94, CFI=.98, TLI=.97, NFI=.94 and RMSEA=.045.

*** Significant at 0.001 level

Note: ID_IN_B : Idealized influence-behaviour; IN_ST: Intellectual stimulation; IN_CN : Individualized consideration; IN_MO : Inspirational motivation

Source : Survey Data, 2020

Convergent validity was achieved for transformational leadership subscales as the factor loadings of the items measuring the constructs are above the minimum requirement of 0.6 (Joreskog & Sorbom, 1979) and the calculated value of Average Variance Extracted (AVE) is greater than the cut-off value of 0.5 (Hair *et al.*, 2014) as shown in Table 3. Construct validity also was achieved as the fitness indexes achieved the required level as suggested by Hair *et al.* (2014).

Based on the CFA results reported in Table 4, convergent validity was achieved for transactional leadership subscales as the factor loadings of the items measuring the constructs are above the minimum requirement of 0.6 (Joreskog & Sorbom, 1979) and the AVE is greater than the cut-off value of 0.5 (Hair *et al.*, 2014). Construct validity also was achieved as the fitness indexes, as shown in

Table 4, achieved the required level as suggested by Hair *et al.* (2014).

Table 4 : : CFA Results of transactional leadership

			Standardized Estimate	P	AVE	CR	Cronbach's alpha
MBE_P4	<---	MBE_P	.661				
MBE_P3	<---	MBE_P	.822	***	0.561	0.762	0.788
MBE_P2	<---	MBE_P	.756	***			
MBE_A3	<---	MBE_A	.688		0.467	0.558	0.636
MBE_A2	<---	MBE_A	.678	***			
CR2	<---	C_REW	.958		0.694	0.765	0.790
CR1	<---	C_REW	.686	***			

Fitness indexes: CMIN/DF=2.03, GFI=.89, AGFI=.91, CFI=.98, TLI=.97, NFI=.97 and RMSEA=.032.

Notes: MBE_A : Management By Exception-active, MBE_P: Management By Exception-passive, C_REW: Contingent Reward

Source: Survey Data, 2020

Table 5 : **CFA Results of employee performance**

			Standardized Estimate	P	AVE	CR	Cronbach's alpha
P_INO4	<---	P_INO	.717		0.660	0.871	0.892
P_INO3	<---	P_INO	.783	***			
P_INO2	<---	P_INO	.875	***			
P_INO1	<---	P_INO	.865	***			
P_TEA4	<---	P_TEA	.799		0.598	0.865	0.864
P_TEA3	<---	P_TEA	.823	***			
P_TEA2	<---	P_TEA	.765	***			
P_TEA1	<---	P_TEA	.700	***			
P_CAR4	<---	P_CAR	.836		0.706	0.823	0.877
P_CAR3	<---	P_CAR	.862	***			
P_CAR2	<---	P_CAR	.823	***			
P_JOB3	<---	P_JOB	.718		0.555	0.797	0.788
P_JOB2	<---	P_JOB	.788	***			
P_JOB1	<---	P_JOB	.728	***			
P_ORG4	<---	P_ORG	.777		0.601	0.774	0.751
P_ORG2	<---	P_ORG	.774	***			

Fitness indexes: CMIN/DF=4.13, GFI=.92, AGFI=.87, CFI=.88, TLI=.87, NFI=.91 and RMSEA=.051.

Note: P_INO: Innovator role; P_TEA: Team role; P_CAR: Career role; P_JOB: Job role; P_ORG: Organization role

Source : Survey data, 2020

As can be seen in Table 5, convergent validity measuring the constructs are above the minimum requirement of 0.6 and the AVE is greater than the cut-off value of 0.5 as shown in subscales as the factor loadings of the items

Table 5. Construct validity also was achieved as the fitness indexes achieved the required level.

Table 6 : CFA Results of psychological empowerment

			Standardize d Estimate	P	AVE	CR	Cronbach' s alpha
EMP_MN3	<---	EMP_MN	0.829		0.596	0.850	0.807
EMP_MN2	<---	EMP_MN	0.826	***			
EMP_MN1	<---	EMP_MN	0.647	***			
EMP_SD3	<---	EMP_SD	0.809		0.575	0.683	0.721
EMP_SD2	<---	EMP_SD	0.704	***			
EMP_CM3	<---	EMP_CM	0.612		0.549	0.888	0.777
EMP_CM2	<---	EMP_CM	0.794	***			
EMP_CM1	<---	EMP_CM	0.802	***			
EMP_IM1	<---	EMP_IM	0.682	***	0.434	0.623	0.604
EMP_IM3	<---	EMP_IM	0.635				

Fitness indexes: CMIN/DF=3.03, GFI=.93, AGFI=.94, CFI=.98, TLI=.97, NFI=.94 and RMSEA=.045.

*** Significant at 0.001 level

Note: EMP_MN: Meaning; EMP_SD: Self determination; EMP_CM: Competence; EMP_IM: Impact

Source: Survey data, 2020

As depicted in Table 6, the factor loadings of the items measuring the empowerment constructs are above 0.6 and the AVE is greater than the cut-off value of 0.5. Therefore, convergent

validity was achieved. Construct validity also was achieved as the fitness indexes achieved the required level.

Table 7 : Collinearity statistics

Model	Collinearity Statistics	
	Tolerance	VIF
Transformational Leadership <--> Performance	.513	1.922
Transactional Leadership <--> Performance	.561	1.883
Transformational Leadership <--> Empowerment	.562	1.798
Transactional Leadership <--> Empowerment	.562	1.778
Psychological Empowerment <--> Performance	.848	1.176

Source: Survey data, 2020

Tolerance and VIF values of each pair of constructs were examined to identify multicollinearity between study constructs. As shown in Table 7, the Tolerance value is above

0.1 and the VIF value is less than 10 for the constructs of this study. These indicate that the values are within the cut-off limits (Hair *et al.*, 2014) and thus there is no multicollinearity

issue in this study frame. Therefore, SEM could be performed to examine the relationship between the constructs and to test the hypotheses of the study.

8.3 Structural Equation Model

After validating each constructs through CFA, the constructs were integrated in the Structural Equation Model (SEM) to identify the direct and indirect effects of variables. The

Figure 2 illustrates the SEM and the standardized coefficients portraying the association between the variables. As depicted in the SEM, correlation between exogenous constructs is 0.77. Thus, the requirement for discriminant validity was achieved as the correlation between exogenous constructs did not exceed 0.85 (Kline, 2005) (Tabachnick & Fidell, 2007).

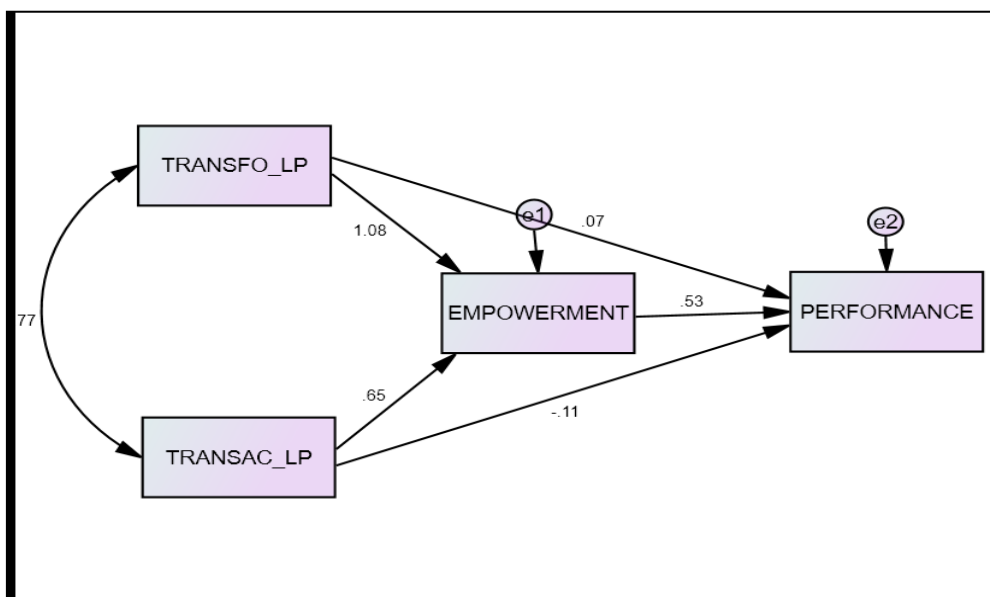


Figure 2: Structural Equation Model

Table 8 : Results of SEM

Variables	Std. Estimate	Unstd. Estimate	P
Transformational leadership -> Performance	.07	.13	***
Transactional leadership -> Performance	-.11	.03	.721
Transformational leadership -> Empowerment	1.08	1.24	***
Transactional leadership -> Empowerment	.65	.76	***
Empowerment -> Performance	.53	.68	***
Indirect effect (based on bootstrap sample)			
Transformational LP -> Empowerment -> Performance	.45		***
Transactional LP -> Empowerment -> Performance	.21		***

Source: Survey data, 2020

The results reported in Table 8 shows that transformational leadership has a significant positive impact on employee performance ($\beta=0.07$; $p<0.01$). Therefore the **hypothesis 1 was supported**.

The results also reveals that the impact of transactional leadership on employee performance is not significant ($\beta= -0.11$; $p=0.721$). Hence the **hypothesis 2 was not supported**.

As can be seen in Table 8, transformational leadership has a significant positive impact on psychological empowerment ($\beta= 1.08$; $p<0.01$). Based on the results, **hypothesis 3 was supported**.

At the same time, transactional leadership also has a significant impact on psychological empowerment ($\beta= 0.07$; $p<0.01$). Therefore, the **hypothesis 4 was supported**.

The mediating effect of transformational and transactional leadership through psychological empowerment was examined based the bootstrap results of SEM. In the current study a bootstrap sample of 2000 was generated based on parent sample and the bias-corrected confidence was set as 95%. As can be seen in Table 8, the results of mediation effect reveals that the indirect effect of transformational leadership on employee performance is significant ($\beta= 0.45$; $p<0.01$). As mentioned earlier, the direct effect of transformational leadership on employee performance also is significant. As both the direct effect and the

indirect effect are significant, it can be confirmed that psychological empowerment partially mediates the impact of transformational leadership on employee performance. Hence, the **hypothesis 5 was supported**.

At the same time, the results reported in Table 8 depicts that the direct effect of transactional leadership on employee performance is not significant ($\beta= -0.11$; $p<0.721$) and the indirect effect of transactional leadership on employee performance through psychological empowerment is significant ($\beta= 0.21$; $p<0.01$). As the direct effect is not significant and the indirect effect is significant, it can be confirmed that psychological empowerment fully mediates the impact of transactional leadership on employee performance. Therefore the **hypothesis 6 was supported**.

9 Discussion

The current study concludes that transformational leadership positively impacts employee performance. The finding is consistent with the existing literature (Jiang *et al.*, 2016) (Sparkling *et al.*, 2016) (Chamika & Gunasekara, 2016) (Karunajeewa, 2018). Surveying the banking sector employees in Sri Lanka, Chamika and Gunasekara (2016) reported that supervisors in banks need to use a lot of transformational leadership behaviors or rather embrace transactional leadership style. From the results, transformational leadership could have larger effects on employee productivity and quality of

performance. Karunajeewa (2018) surveyed a Sri Lankan Company and found that transformational leadership has a positive impact on employee performance. Therefore, the finding of the current study comply with the empirical evidences in Sri Lanka.

The finding that transactional leadership doesn't significantly impact employee performance is not consistent with the literature (Muterera, 2012) (Paracha *et al.*, 2012). Surveying a Sri Lankan company, Karunajeewa (2018) found that transactional leadership negatively impacts employee performance. In the present globalized economy the transactional leadership style is observed to be less effective. The employees in current organizations prefer to work under transformational leaders than transactional leaders (Bass, 1999) (Evans, 2005).

In the current study, it was identified that transformational leadership positively impacts psychological empowerment and the result is in line with the studies of Pradhan *et al.* (2017) and Suer (2017). Further, transactional leadership also positively impacts psychological empowerment and the result is in line with the studies of Ma and Jiang (2018) and Pieterse *et al.* (2010).

As an important part of the study, the mediating effect of psychological empowerment in the association between the leadership styles and employee performance was examined. The results reveal that psychological empowerment mediates the

impact of transformational and transactional leadership on employee performance and the results are consistent with the previous studies by Bartram & Casimir (2007), Tung (2016) and Wei *et al.* (2010) respectively.

10 Conclusion and Implications

The results of the current study revealed that transformational leadership is a predictor of employee performance whereas transactional leadership does not predict employee performance. Further, psychological empowerment significantly mediates the impact of transformational as well as transactional leadership on employee performance. It is believed that this study will be helpful for the leaders and administrators in the public sector. Considering the findings of the current study, the leaders of the public sector may pay more attention in their leadership style as a way to boost employee performance levels. As public service is given more priority for promoting the life of people and the developing the region, practicing appropriate leadership style in the public sector becomes vital.

The current study gives an insight that employees should be empowered adequately for enhancing their performance. True empowerment could be found if employees perceive that they are empowered. Previous studies have not investigated the mediating role of psychological empowerment in the leadership-performance relationship in the Sri Lankan context. Hence, the finding of the current study contributes to the body of

knowledge. The findings of the study will be a base for future researchers, students and academicians to understand the effect of transformational and transactional leadership styles on employees' performance. The public sector organizations will be able to consider the findings of this research for developing leadership programmes in order to enhance appropriate leadership skills. The findings will also help leaders in recognizing the most appropriate leadership style to enhance employee performance.

11 Limitations and Directions for Future Research

The present study revealed that transformational leadership influences job performance of employees, at the same time, transactional leadership doesn't influence performance of employees. However, there are a number of limitations in the study. The present study was limited to the public sector organizations in the Northern Province of Sri Lanka. The other regions should be covered by the future researchers to confirm the results of the current study. Further, it is necessary to survey the private sector employees. In addition, as the current study employed a cross sectional survey method, it is better to do a longitudinal study and the data could be

collected using different techniques. Particularly, the transformational and transactional leadership styles were taken for investigation in the present study and thus the other styles such as laissez-faire leadership, servant leadership, people oriented and task oriented leadership styles could be considered by future researchers. In addition, this study was conducted in the context of Northern Province of Sri Lanka. The study should be extended to other public sector organizations and including larger samples to find the leadership style that enhance employee performance and the factors mediating the effect of leadership on employee performance.

Among various employee behaviour dimensions, performance was investigated in the current study and therefore, future researchers need to investigate the influence of leadership styles on other dimensions of employee behaviours like time management, conduct at work, attendance, job satisfaction, organizational citizenship behaviour, etc. As there are not adequate studies in the public sector in Sri Lanka, more research should follow with different samples from various sectors, types of businesses and in different regions.

12 References

- Ahmad, H., & Gelaidan, H. M. (2011). Organisational Culture, Leadership Styles and Employee's Affective Commitment to Change: A Case of Yemen Public Sector. *Journal of Organizational Management Studies*, 2011, 1-10. doi:10.5171/2011.722551
- Allameh, S. M., Heydari, M., & Davoodi, S. M. (2012). Studying the relationship between transformational leadership and psychological empowerment of teachers in Abade Township. *Procedia-Social and Behavioral Sciences*, 31, 224-230. doi:10.1016/j.sbspro.2011.12.046

- Andreani, F., & Petrik, A. (2016). Employee Performance as the Impact of Transformational Leadership and Job Satisfaction in Pt Anugerah Baru Denpasar. *Journal of Management and JMK*, 18(1), 25–32. doi:10.9744/jmk.18.1.25-32
- Arham, A. F., & Muenjohn, N. (2012). Leadership and organisational performance in Malaysian SMEs: The mediating role of entrepreneurial orientation. *Business and Information*, 31-41.
- Athukorala, C., Perera, I., & Meedeniya, D. (2016). The impact of transformational and transactional leadership styles on knowledge creation in Sri Lankan software industry. *2016 Moratuwa Engineering Research Conference (MERCon)* (pp. 309-314). IEEE. doi:10.1109/MERCon.2016.7480159
- Avolio, B. J., Bass, B. M., & Jung, J. (1999). Reexamining the components of transformational and transactional leadership using the Multifactor Leadership Questionnaire. *Journal of Occupational and Organizational Psychology*, 72(4), 441-462. doi:10.1348/096317999166789
- Balaji, M., & Krishnan, V. R. (2014). Impact of transformational leadership on empowerment: Mediating role of social identity. *International Journal on Leadership*, 2(1), 34-42. Retrieved from <http://www.publishingindia.com>
- Barbuto, J. E. (2005). Motivation and transactional, charismatic and transformational leadership: A test of antecedents. *Journal of Leadership & Organizational Studies*, 11(4), 26-40. Retrieved from http://www.academy.umd.edu/publications/journal_lead_studies/jls.htm
- Bartram, T., & Casimir, G. (2007). The relationship between leadership and follower in-role performance and satisfaction with the leader: the mediating effects of empowerment and trust in the leader. *Leadership & Organization Development Journal*, 28(1), 4-19. doi:10.1108/01437730710718218
- Basham, L. M. (2012). Transformational and transactional leaders in higher education. *SAM Advanced Management Journal*, 77(2), 15-23.
- Bass, B. M. (1985). *Leadership and performance beyond expectations*. New York: The Free Press.
- Bass, B. M. (1999). Two decades of research and development in transformational leadership. *European Journal of Work and Organizational Psychology*, 8(1), 9-32. doi:10.1080/135943299398410
- Bass, B. M., & Avolio, B. J. (1997). *Full range leadership development :Manual for multifactor leadership questionnaire*. California: Mind Garden, Inc.
- Bass, B. M., & Avolio, B. J. (2000). *MLQ Multifactor Leadership Questionnaire sample set: Technical report, leaders form, rater form, and scoring key for MLQ From 5x-Short* (2nd ed.). California: Mind Garden, Inc.
- Bass, B., & Avolio, B. J. (Eds.). (1994). *Improving organizational effectiveness through transformational leadership*. Thousand Oaks: Sage Publications.
- Behery, M. H. (2008). Leadership, knowledge sharing and organizational benefits within the UAE. *Journal of American Academy of Business*, 12(2), 227-237.
- Behling, O., & McFillen, J. M. (1996). A Syncretical Model of Charismatic/ Transformational Leadership. *Group & Organization Management*, 21(2), 163-191. doi:10.1177/1059601196212004
- Boamah, S. A., Laschinger, H. K., Wong, C., & Clarke, S. (2018). Effect of transformational leadership on job satisfaction and patient safety outcomes. *Nursing outlook*, 66(2), 180-189. doi:10.1016/j.outlook.2017.10.004
- Bolden, R., Gosling, J., O'Brien, S., Peters, K., Ryan, M., & Haslam, A. (2012). *Academic leadership: changing conceptions, identities and experiences in UK higher education*.

- (Research and Development Series, Publication 4; Series 3). England: Leadership Foundation for Higher Education.
- Burns, J. (1978). *Leadership*. New York: Harper Torchbooks.
- Cavazotte, F., Moreno, V., & Bernardo, J. (2013). Transformational leaders and work performance: The mediating roles of identification and self-efficacy. *BAR-Brazilian Administration Review*, 10(4), 490-512. doi:10.1590/S1807-76922013000400007
- Chamika, M. W., & Gunasekara, U. L. (2016). The Impact of Leadership Styles on Employee Performance. *Proceedings of the Undergraduates Research Conference - 2016* (p. 11). Keleniya: Department of Accountancy, Faculty of Commerce and Management Studies, University of Kelaniya,. Retrieved from <http://repository.kln.ac.lk/handle/123456789/16434>
- Chan, S. H. (2010). The influence of leadership expertise and experience on organizational performance: a study of Amanah Ikhtiar Malaysia. *Asia Pacific Business Review*, 16(1-2), 59-77.
- Chaudhry, A. Q., & Javed, H. (2012). Impact of Transactional and Laissez Faire Leadership Style on Motivation. *International Journal of Business and Social Science*, 3(7), 258-264. Retrieved from https://ijbssnet.com/journals/Vol_3_No_7_April_2012/28.pdf
- Cole, G. A. (2002). *Personnel and Human Resource Management* (5th ed.). London: Continuum Publisher.
- Conger, J., & Kanungo, R. (1988). The empowerment process: Integrating theory and practice. *Academy of Management Review*, 13(3), 471-482. doi:10.2307/258093
- Corea, G. (1988). Case or No Case for Privatisation in Sri Lanka. *Central Bank News Survey*, 8(3), 1-5.
- Deluga, R. J. (1998). Relationship of Transformational and Transactional Leadership with Employee Influencing Strategies. *Group and Organization Studies*, 13(4), 456-467. doi:10.1177/105960118801300404
- Department of Census and Statistics. (2018). *Census of Public and Semi Government Sector Employment - 2016*. Colombo: Department of Census and Statistics, Ministry of National Policies and Economic Affairs, Sri Lanka.
- Dhammika, K. A. (2013). Measuring Employees' Performance in the Public Sector in Sri Lanka: Testing of Two Models. *Kelaniya Journal of Human Resource Management*, 8(1), 1-20. doi:doi.org/10.4038/kjhrm.v8i1.1
- Dhammika, K. A., Ahmad, F. B., & Sam, T. L. (2013). Transactional, Transformational, Union and Organizational Commitment: An Examination of the Effect Flaws. *International Journal of Business and Social Science*, 4(6), 103 -111.
- Emery, C. R., & Barker, K. J. (2007). The effect of transactional and transformational leadership styles on the organizational commitment and job satisfaction of customer contact personnel. *Journal of organizational culture, communications and conflict*, 11(1), 77-90.
- Epitropaki, O., & Martin, T. (2005). The moderating role of individual differences in the relation between transformational/ transactional leadership perceptions and organizational identification. *Leadership Quarterly*, 16(4), 569-589.
- Erkutlu, H. (2008). The impact of transformational leadership on organizational and leadership effectiveness. *Journal of Management Development*, 27(7), 708-726.
- Evans, J. (2005). A test of transformational and transactional leadership styles on employees' satisfaction in the UAE banking. *Journal of Comparative International Management*, 8(1), 3-20.
- Fang-guo, S. (2013). Multilevel model of transformational leadership and service quality: testing mediation role of psychological empowerment. 2013

- International Conference on Management Science and Engineering 20th Annual Conference Proceedings*, (pp. 1355-1362). doi:10.1109/ICMSE.2013.6586448.
- Fernando, M. E. (2018). Impact of manager's leadership style on employees' emotional intelligence on virtual project performance in the Sri Lankan IT industry. *Master's dissertation, University of Moratuwa, Sri Lanka*. Retrieved from <http://dl.lib.mrt.ac.lk/handle/123/13312>
- George, D., & Mallery, M. (2010). *SPSS for Windows Step by Step: A Simple Guide and Reference, 17.0 update* (10th ed.). Boston: Pearson.
- Gill, R. (1998). Cross-cultural comparison of the leadership styles and behavior of managers in the UK, USA and Southeast Asia. *Asian Academy of Management Journal*, 3, 19–32.
- Gimuguni, L., Nandutu, J., & Magolo, A. (2014). *Effect of leadership styles on performance of local governments in Uganda, A case of Mbale District*. Retrieved from <http://ir.mu.ac.ke:8080/xmlui/bitstream/handle/123456789/2141/Nandutu%20J.pdf?sequence=1&isAllowed=y>
- Gkorezis, P., & Petridou, E. (2008). Employees' psychological empowerment via intrinsic and extrinsic rewards. *Academy of Healthcare Management Journal*, 4(1), 17-39.
- Grunig, J. E. (1992). Symmetrical systems of internal communication. In J. E. Grunig (Ed.), *Excellence in public relations and communication management* (pp. 531-576). New Jersey: Lawrence Erlbaum Associates.
- Gunaruwan, T. L. (2016). Unsatisfactory Performance of Sri Lanka's State-Owned Enterprises: Causality Diagnostics in Management Autonomy and Accountability. *5th International Conference of Sri Lanka Forum of University Economists* (pp. 67-72). Kelaniya: Department of Economics, University of Kelaniya.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2014). *Multivariate Data Analysis* (7th ed.). London: Pearson Education Limited.
- Hair, J. J., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate Data Analysis* (6th ed.). New Jersey: Pearson Prentice Hall.
- Han, S., Seo, G., Yoon, S., & Yoon, D. (2016). Transformational leadership and knowledge sharing: Mediating roles of employee's empowerment, commitment, and citizenship behaviors. *Journal of Workplace Learning*, 28, 130–149.
- Hater, J., & Bass, B. (1988). Superiors' evaluations and subordinates' perceptions of transformational and transactional leadership. *Journal of Applied Psychology*, 73(4), 695-702.
- Herbst, T. H., & Conradie, P. D. (2011). Leadership effectiveness in higher education: managerial self-perceptions versus perceptions of others. *South African Journal of Psychology*, 37(1), 1-14.
- Ismail, A., Mohamad, M. H., Mohamed, H. A., Rafiuddin, N. M., & Zhen, K. W. (2010). Transformational and Transactional Leadership Styles as a Predictor of Individual Outcomes. *Theoretical & Applied Economics*, 17(6), 89-104.
- Ispas, A., & Babaita, C. (2012). The effects of leadership style on the Employees' Job satisfaction and Organizational commitment from the Hotel Industry. *Approaches in Organizational Management*, 15(16), 254-262.
- Jayakody, J. A. (2008). Charismatic leadership in Sri Lankan business organizations. *Journal of Management Development*, 27(5), 480-498.
- Jayasigam, S., & Cheng, M. Y. (2009). Leadership style and perception of effectiveness: Enlightening Malaysian managers. *Asian Social Science*, 5(2), 54-65.
- Jha, S. (2013). Managerial practices, transformational leadership, customer satisfaction and self-

- efficacy as antecedents of psychological empowerment: A study of Indian IT sector. *Journal of Management Research*, 13(2), 105.
- Jiang, W., Lu, Y., & Le, Y. (2016). Trust and project success: A two fold perspective between owners and contractors. *Journal of Management Engineering*, 32(6). doi:10.1061/(ASCE)ME.1943-5479.0000469
- Jiang, W., Zhao, X., & Ni, J. (2017). The Impact of Transformational Leadership on Employee Sustainable Performance: The Mediating Role of Organizational Citizenship Behavior. *Sustainability*, 9(9), 1567. doi:10.3389/fpsyg.2020.00314
- Jong, J., & Hartog, D. (2007). How leaders influence employees' innovative behavior. *European Journal of Innovation Management*, 10(1), 41-64.
- Joreskog, K., & Sorbom, D. (1979). *Advances in factor analysis and structural equation models*. Abt Books.
- Karunajeewa, D. (2018). Impact of leadership styles on employee performance: Case study on a service base company. *Master Thesis submitted to University of Moratuwa*. Retrieved from Master Thesis submitted to University of Moratuwa.
- Kasturi Arachchi, C. (2011). An investigation of the leadership experiences of principals in the government schools in Sri Lanka. *Proceedings of Annual Research Symposium* (pp. 95-99). Colombo: University of Colombo, Sri Lanka.
- Kehinde, O., & Banjo, H. (2014). A test of the impact of leadership styles on employee performance: A study of department of petroleum resources. *International Journal of Management Sciences*, 2(3), 149-160.
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford Press.
- Lopez-Dominguez, M., Enache, M., Sallan, J., & Simo, P. (2014). Transformational leadership as an antecedent of change oriented organizational citizenship behavior. *Journal of Business Research*, 66(10), 2147-2152.
- Ma, X., & Jiang, W. (2018). Transformational leadership, transactional leadership, and employee creativity in entrepreneurial firms. *The Journal of Applied Behavioral Science*, 54(3), 302-324. Retrieved from <https://doi.org/10.1177%2F0021886318764346>
- Martin, C. A., & Bush, A. J. (2006). Psychological climate, empowerment, leadership style, and customer-oriented selling: an analysis of the sales manager-salesperson dyad. *Journal of the Academy of Marketing Science*, 34(3), 419-438.
- Mathis, C. L., Fredrick, G. Y., & Kenneth, O. P. (2009). How do you motivate employees? *Harvard Business Review*, 46(1), 53-62.
- Mathotaarachchi, K. P. (2013). The impact of transformational and transactional leadership behaviours on employees' trust and their organizational commitment for non-teaching staff of the Sri Lankan Universities. *The Macrotheme Review. A Multidisciplinary Journal of Global Macro Trends*, 2(1), 56-92.
- Murphy, P. R., & Jackson, S. E. (1999). Managing work role performance: challenges for 21st century organization and employees. In D. R. Ilgen, & E. D. Pulakos, *The Changing Nature of Work Performance* (pp. 325-365). San Francisco: Jossey-Bass.
- Muterera, J. (2012). Leadership Behaviours and Their Impact on Organizational Performance in Governmental Entities. *International Journal of Sustainable Development*, 3(8), 19-24.
- Nel, P. S., van Dyk, P. S., Haasbroek, G. D., Schultz, H. B., Sono, T. J., & Werner, A. (2004). *Human Resources Management* (6th ed.). New York: Oxford University Press.
- Nmadu, G. (2013). Employees performance and its effects on their job performance in workplace. Kuwait Chapter of Arabian.

- Journal of Business and Management Review*, 5(11), 13-23.
- Northouse, P. G. (2007). *Leadership: Theory and practice* (4th ed.). California: Sage publications.
- Obiwuru, T. C., Okwu, A. T., Akpa, V. O., & Nwankwere, I. A. (2011). Effects of Leadership Style on Organizational Performance: A Survey of Selected Small Scale Enterprises in Ikosi-Ketu Council Development Area of Lagos State, Nigeria. *Australian Journal of Business and Management Research*, 1(7), 100- 111.
- Olanrewaju, J. A. (2009). The influence of leadership on employees' commitment to the Nigerian Public Service: Implications for organizational effectiveness. *Doctoral thesis submitted to the Carpell University, United States*.
- Organ, D. (1998). *Organizational Citizenship Behavior: The Good Soldier Syndrome*. Lexington, KY: Lexington Books/DC Heath and Company.
- Ozaralli, N. (2002). Effects of transformational leadership on empowerment and team effectiveness. *Leadership and organization development Journal*, 24(6), 335-344.
- Paracha, M. U., Qamar, A., Mirza, A., Hassan, I., & Waqas, H. (2012). Impact of leadership style (transformational & transactional leadership) on employee performance & mediating role of job satisfaction: Study of private school (educator) in Pakistan. *Global Journal of Management and Business Research*, 12(4), 55-64.
- Pieterse, A. N., Van Knippenberg, D., Schippers, M., & Stam, D. (2010). Transformational and transactional leadership and innovative behavior: The moderating role of psychological empowerment. *Journal of organizational behavior*, 31(4), 609-623.
- Podsakoff, P. M., Mackenzie, S. B., Moorman, R. H., & Fetter, R. (1990). Transformational leader behaviors and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviors. *Leadership Quarterly*, 1(2), 107-142.
- Pradeep, D. D., & Prabhu, N. R. (2011). The relationship between effective leadership and employee performance. *Journal of Advancements in Information Technology*, 20, 198-207.
- Pradhan, R. K., Panda, M., & Jena, L. K. (2017). Transformational leadership and psychological empowerment. *Journal of Enterprise Information Management*, 30(1), 82-95. Retrieved from <https://doi.org/10.1108/JEIM-01-2016-0026>
- Rasool, H. F., Arfeen, I. U., Mothi, W., & Aslam, U. (2015). Leadership styles and its impact on employee's performance in health sector of Pakistan. *City University Research Journal*, 5(1), 97-109.
- Rathnathilaka, R. M., Madushani, H. D., Perera, L. G., Dasanayake, D. M., Nayomi, W. V., Kulasinghe, K. S., & Madushanka, G. L. (2016). Social Network Usage of Government Employees in Sri Lanka. *Journal of Social Statistics*, 3(2), 6-21.
- Raveendran, T. (2021). Effect of transformational leadership on organizational commitment through the interaction of psychological empowerment. *Proceedings of International Conference on Contemporary management (ICCM)* (pp. 22 - 50). Jaffna: Faculty of Management Studies and Commerce, University of Jaffna. doi:10.4038/jbs.v8i0.66
- Raveendran, T., & Gamage, A. (2019). The Mediating Effect of Organizational Commitment in the Impact of Transformational Leadership Style on Employee Performance: A Study of Divisional Secretariats in the Jaffna District. *International Journal of Human Resource Studies*, 9(2), 116-139. doi:10.5296/ijhrs.v9i2.14623
- Rawashdeh, A., Elayan, M., Shamout, M., & Saleh, M. (2020). Job satisfaction as a mediator between Transformational leadership and employee performance: Evidence from a developing country. *Management Science Letters*, 10(6), 3855-3864.
- Sagnak, M., KuruOz, M., Polat, B., & Soylu, A. (2015). Transformational leadership and innovative

- climate: An examination of the mediating effect of psychological empowerment. *Eurasian Journal of Educational Research*, 15(60), 149-162.
- Sani, A., & Maharani, V. (2012). The impact of transformational leadership and organizational commitment on job performance among lecturers of faculty in the Islamic Maulana Malik Ibrahim Malang University: the mediating effects of organisational citizenship behavior. *International Journal of Academic Research*, 4(4), 102-106.
- Spangler, W. D., & Braiotta, J. L. (1990). Leadership and corporate audit committee effectiveness. *Group & Organization Studies*, 15(2), 134-157.
- Sparkling, A., Mollaoglu, S., & A., K. (2016). Research synthesis connecting trends in architecture, engineering, and construction project partnering. *Journal of Management & Engineering*, 33. doi:10.1061/(ASCE)ME.1943-5479.0000481
- Spreitzer, G. M. (1995). Psychological empowerment in the workplace: Dimensions, measurement, and validation. *Academy of Management Journal*, 38(5), 1442-1465. Retrieved from <https://doi.org/10.5465/256865>
- Sreejesh, S., Mohapatra, S., & Anusree, M. R. (2014). *Business research methods: An applied orientation*. New York: Springer International Publishing.
- Stacks, D. W. (2010). *Primer of public relations research* (2nd ed.). New York: Guildford Press.
- Suer, F. C. (2017). The Effect of Leadership Styles on Employees' psychological Empowerment and the Gender Role in this Relation. *Research Journal of Business and Management*, 4(4), 434-446.
- Suryanarayana, A. (2011). An empirical study into transactional and transformational leadership. *International Conference on Human Resource Management and Professional Development for the Digital Age (HRM and PD) Proceedings*, (pp. 54-68).
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Boston: Allyn & Bacon.
- Thomas, K. W., & Velthouse, B. A. (1990). Cognitive elements of empowerment: An "interpretive" model of intrinsic task motivation. *Academy of management review*, 15(4), 666-681.
- Tseng, H., & Huang, X. (2009). A Study on the Effect of the Degree of Optimism, Work Pressure and Work Efforts of Life-Insurance Salesman on Their Performance. *Journal of American Academy of Business*, 14(2), 133-144.
- Tsigu, G. T., & Rao, D. P. (2015). Leadership styles: their impact on job outcomes in Ethiopian banking industry. *ZENITH International Journal of Business Economics & Management Research*, 5(2), 41-52.
- Tung, F. C. (2016). Does transformational, ambidextrous, transactional leadership promote employee creativity? Mediating effects of empowerment and promotion focus. *International Journal of Manpower*, 37(8), 1250-1263.
- Vinger, G. (2009). The restructuring of a university: a call for the exhibition of transformational leadership behaviours. *The International Journal of Learning*, 16(10), 267-286.
- Walumbwa, F. O., Orwa, B., Wang, P., & Lawler, J. J. (2005). Transformational Leadership, Organizational Commitment, and Job Satisfaction: A Comparative Study of Kenyan and U.S. Financial Firms. *Human Resource Development Quarterly*, 16(2), 235-257.
- Walumbwa, F. O., Wang, P., Lawler, J. J., & Shi, K. (2004). The role of collective efficacy in the relations between transformational leadership and work outcomes. *Journal of Occupational and Organizational Psychology*, 77(4), 515-530.

- Warnakula, W. M., & Manickam, B. (2010). Employees' behaviour in online social networking websites (SNSs). *Tropical Agricultural Research*, 22(1), 94-106.
- Wei, F., Yuan, X., & Di, Y. (2010). Effects of transactional leadership, psychological empowerment and empowerment climate on creative performance of subordinates: A cross-level study. *Frontiers of Literary Studies in China*, 4(1), 29-46.
- Welbourne, T. M., Johnson, D. E., & Erez, A. (1998). The role-based performance scale: validity analysis of a theory-based measure. *Academy of Management Journal*, 41(5), 540-555.
- Wijesiri, L. (2016). Turning towards an effective and efficient public service. *Daily News*. Retrieved July 10, 2017, from <http://dailynews.lk/2016/02/01/features/turning-towards-effective-and-efficient-public-service>
- Yammarino, F. J., & Dubinsky, A. J. (1994). Transformational leadership theory: Using levels of analysis to determine boundary conditions. *Personnel psychology*, 47(4), 787-811.