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담당부서	재정정보분석본부 재정분석기획부 dBrain운영본부 dBrain기획부	담당자	정성호 부장(02-6908-8591) 이현석 부장(02-6908-8671)

한국재정시스템의 코로나 대응 과정, SSCI 저널에 등재

- 국가재정시스템 디브레인(dBrain)을 운영하는 한국재정정보원이 코로나19에 맞서 디브레인 운영업무를 안정화시키는 과정을 학술적으로 조명한 논문이 SSCI* 저널에 실렸다.

* SSCI 저널 : Social Sciences Citation Index(사회과학 학술논문인용지수)에 포함된 전세계 40여개 톱 저널.

- 디브레인은 우리나라 중앙정부의 500조원대 예산편성, 집행, 결산 등 국가재정활동 전반을 지원하는 전산시스템이며, 하루 이체금액만 9조원대에 이른다.

- 재정정보원은 30일, 국제저널 『Public Money & Management』가 정보원 정성호 연구위원의 논문 『K방역과 재정시스템』의 등재를 확정하고, 이 저널 온라인판에 게재했다고 밝혔다. 논문은 22년1월 저널 인쇄본에도 실릴 예정이다.

* 논문 원제 : K-Prevention and South Korea's integrated financial management information system

- 『Public Money & Management』은 영국 공공부문회계사협회(CIPFA)가 발행하는 SSCI 저널이며, 사회과학 중에서도 공공재정 분야에서 세계적인 권위를 인정받고 있다.

- 정 연구위원은 논문에서 “폐쇄망에서 운영되는 재정시스템

(dBrain*) 특성상, 운영인력이 코로나19 감염으로 집단격리 되면 코로나용 추정 편성·집행을 비롯한 국가재정활동이 전면 중단되는 위기상황이 올 수 있었다”고 진단했다.

- 이에 재정정보원은 △사무실 이원화 △인력 분산 △비대면 업무환경 구축 등을 통해 현재까지 운영인력 감염이나 시스템 중단이 발생하지 않도록 할 수 있었다.
- 특히, 시스템사용자 교육을 비대면으로 전환하면서 비게된 교육장을 콜센터의 밀집환경 개선용으로 무료 제공함으로써 콜센터 등 협력업체 직원의 감염도 막을 수 있었다.
- 정 연구위원은 “그동안 각국의 재정시스템 보호조치는 해킹방어와 장애예방에 국한됐으나, 한국의 이번 사례가 전과되면서 재정시스템 보호범위가 운영인력 보호 및 비대면 사용 지원으로 확장되는 계기가 됐다”고 평가했다.
- 실제 세계은행, 미주개발은행 등은 한국재정정보원과 함께 개도국을 대상으로 ‘한국 재정시스템의 회복력’이라는 온라인 교육 및 세미나를 개최하기도 했다.

※[참고 1] 논문 주요내용 요약

[참고 2] 온라인판에 실린 논문 원본(영문)

참고 1

논문 주요내용 요약

- (재정시스템 역할) 연간 500조원대의 예산편성·집행·결산이 재정시스템에서 이뤄지기 때문에 시스템 중단은 국가재정활동의 전면 중단을 의미
 - 일상적 재정활동은 물론 코로나19 등의 재난상황에서 예비비를 풀거나 추경을 편성·집행하는 등 재난 대응도 재정시스템의 안정적 운영이 필수
- (한국의 5가지 대응방향) 재정시스템 중단 상황은 기존에 상정했던 해킹·장애 이외에 운영인력 집단감염으로도 발생할 수 있어 새로운 대응 필요
 - (분산과 연결) 확진자 발생으로 시스템 운영인력이 전멸(집단격리)되는 상황을 막기 위해 기획재정부·한국재정정보원은 운영인력은 정부과천청사 임시사무실로, 보안인력은 대전 국가정보자원관리원으로 분산
 - 해당 임시사무실에 국가전용망을 증설해 인력은 분산하되 업무는 연결
 - (선택과 집중) 재정시스템의 많은 기능 중에서 '어떤 상황에서도 반드시 살려야하는' 필수유지기능을 선정하고, 우선순위에 맞는 인력배치
 - (고객접점 보호) 고객의 1차 접점인 콜센터를 보호하기 위해 밀집환경 해소용 공간 및 통신망 제공, 챗봇서비스 확대, 전화응대율 하락 용인
 - (비대면 업무환경) 기존의 비대면 업무인프라에 더해 고객 대응 비대면화, 시스템 사용자에게 대한 화상교육 강화, 채팅 및 온라인게시판 확대
 - (위기대응 매뉴얼) 자연·사회재난 대응 매뉴얼에 감염병을 추가하고 감염병 발생지점별 복무 시나리오, 인력백업계획, 업무연속성계획 등 마련
- (결론) 코로나 이전의 재정시스템 업무연속성(BCP)은 해킹방어와 장애예방을 위한 점검 및 모의훈련에 의해 유지됐지만, 코로나 이후의 업무연속성 계획은 운영인력보호, 사용자 비대면업무 지원 등을 포괄해야 함
 - 업무연속성의 개념을 재정의하는 것에서 시작해야하고, 한국의 경험을 다른 나라와 공유할 필요



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Debate: 'K-Prevention' and South Korea's integrated financial management information system

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South Korea has gained international attention for its response to the Covid-19 pandemic: its so-called 'K-Prevention'. K-Prevention's success is related to the continued operation of the Digital Budget and Accounting System—the 'dBrain'—which is owned by the Ministry of Economy and Finance (MOEF) and operated by the Korea Public Finance Information Service (KPFIS). It is through the dBrain that the Korean government organizes, executes and accounts for a 500 trillion Korean won budget and manages its national assets. The distribution of reserve funds or supplementary budgets during a social crisis such as Covid-19 occurs through dBrain. It is the most fundamental operational component of the government, managing everyday transactions worth 8.7 trillion Korean won. In short, if dBrain stops, all aspects of the Korean government's financial policy stop.

Dispersion and connection

If we were to interpret the South Korean government's Covid-19 prevention regulations by the book, an entire staff and facility would be instantly off-limits if a single person among that organization's operating personnel were to be infected. This would lead to a total system shutdown. While the urgency for dispersion of personnel to protect the dBrain was clear, the problem was that dBrain could only be operated at the locations where the government's secure network system had been installed.

To prevent the possibility of a total system shutdown, and with assistance from the Ministry of the Interior and Safety and the Ministry of Economy and Finance, KPFIS started construction works at the 'Gwachon' government complex in mid February 2020. A virtual network system (GVPN4) was set up so that 17 essential staff members could continue work at home in the absence of the government's secure network. Although they were physically dispersed, these staff members were connected through ICT. Maintenance and repair of GVPN4 was divided between the Seoul headquarters and the Daejeon branch office. Once the temporary office in Gwachon Complex opened on 10 March 2020, 37 staff members working on dBrain and e-Naradoum (an integrated subsidy management system) were relocated to it. This dispersion was to ensure that the system would run smoothly whatever happened in the Seoul headquarters. The Gwachon facility was replaced in June 2020 by a new facility across the street from the Seoul headquarters.

Prioritizing core functions

The dispersion of the essential staff required to operate the dBrain and e-Naradoum systems to the temporary office in Gwachon followed an evaluation of the core system functions that had to operate under any circumstances. This was a reasonable decision given that it would be impossible to operate the literally hundreds of dBrain functions under challenging circumstances. Work was therefore prioritized in terms of national importance. For instance, the functions to support the supplementary budgets that South Korea is using to respond to the Covid-19 economic crisis were deemed essential. Fiscal functions with fixed timetables that are required by law were deemed essential as well. Next, a set of priority functions were designated for different levels of the crisis situation and the key staff members who needed to be dispersed were identified.

Customer interaction

The dispersion had an unfortunate effect on the over 1500 daily calls made to KPFIS with questions regarding dBrain use. These questions are handled by a call centre which is outsourced to a private operator. Call

centres are one of the most vulnerable environments in terms of infection risks due to their high density and the job involving constant talking. KPFIS lent out part of its facility to allow the dispersed working of the call centre staff. Of the 32 call centre staff members working at the original site, half were transferred to the temporary office thus reducing density in both sites. Furthermore, crosscontamination by respiratory droplets among coworkers was prevented by installing a transparent partition between desks. The communication network required to support the call centre division was also provided by KPFIS. In addition, KPFIS allowed a temporary drop in response rate following the dispersion and promoted a chat-box service to handle increased user waiting time.

Remote system

One of the factors that allowed KPFIS to quickly engage in dispersed working was the well established remote working infrastructure of the Korean government and KPFIS. Staff working from home had full access to the work process through global virtual private network (GVPN) and video conferencing. Customer service functions were reformed in light of the remote environment. When a user reported a technical error in using dBrain, 17 staff members were able to remotely access the user's PC to solve the issue. Group learning exercises were transitioned to online education, and Q&A were supported remotely by expanding chat and message board functions. The differing responsibilities of the headquarters and the temporary auxiliary office were clearly distinguished. This is because the stable operation of dBrain is essential in any situation, such as the closure of the headquarters building or the isolation of all employees.

Emergency response manual

When KPFIS last updated its emergency response manual in January 2020, pandemics were added to the list of social and natural disasters including earthquakes, fires and hacking. In particular, 'work scenario under confirmed case' was explained so that every staff member would know how to act if a Covid-19 outbreak takes place. KPFIS at least prepared itself with a clear plan of action in case of infection.

Conclusion

Before Covid-19, hacking defence and crash prevention were the primary objectives of the business continuity plan (BCP) of IFMIS. However, IFMIS' BCP now needs to be expanded to include safeguarding operational personnel, as well offsite user support. In this context, it is important to share Korea's experience (see more details, Jeong & Oh, 2019) with other countries. Policy-makers and managers (fiscal authority and institutions operating IFMIS) should seek to create a global standard that will guarantee BCP. This work should start by redefining what we mean by BCP.

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