

A Framework for the Built Environment supportive of Resilient Performance in the Connecting Areas of an Intensive Care Unit

Natália Ransolin^{1,3}, Tarcísio Abreu Saurin², Robyn Clay-Williams³,
Carlos Torres Formoso¹, Frances Rapport³

#1490

¹ Postgraduate Program in Civil Engineering: Construction and Infrastructure (PPGCI), Federal University of Rio Grande do Sul (UFRGS), Porto Alegre, Brazil
² Industrial Engineering and Transportation Department (DEPROT), UFRGS, Porto Alegre, Brazil
³ Australian Institute of Health Innovation (AIHI), Macquarie University, Sydney, Australia

INTRODUCTION

Resilient performance is an emergent property arising from the dynamic interactions between diverse technical, social, and organizational elements of complex systems [1]. Health services have long been acknowledged as complex systems that display resilience to cope with both expected and unexpected conditions while maintaining the delivery of the required outputs [2], [3]. **The built environment is a key technical element of most health services, as it has a strong impact in the service efficiency, safety, and resilience [4].** In particular, connecting areas of Intensive Care Units (c-ICU areas) are workspaces where internal hospital logistics and care delivery take place, supporting or hindering the resilient performance of staff to trade-off between safety and efficiency pressures.

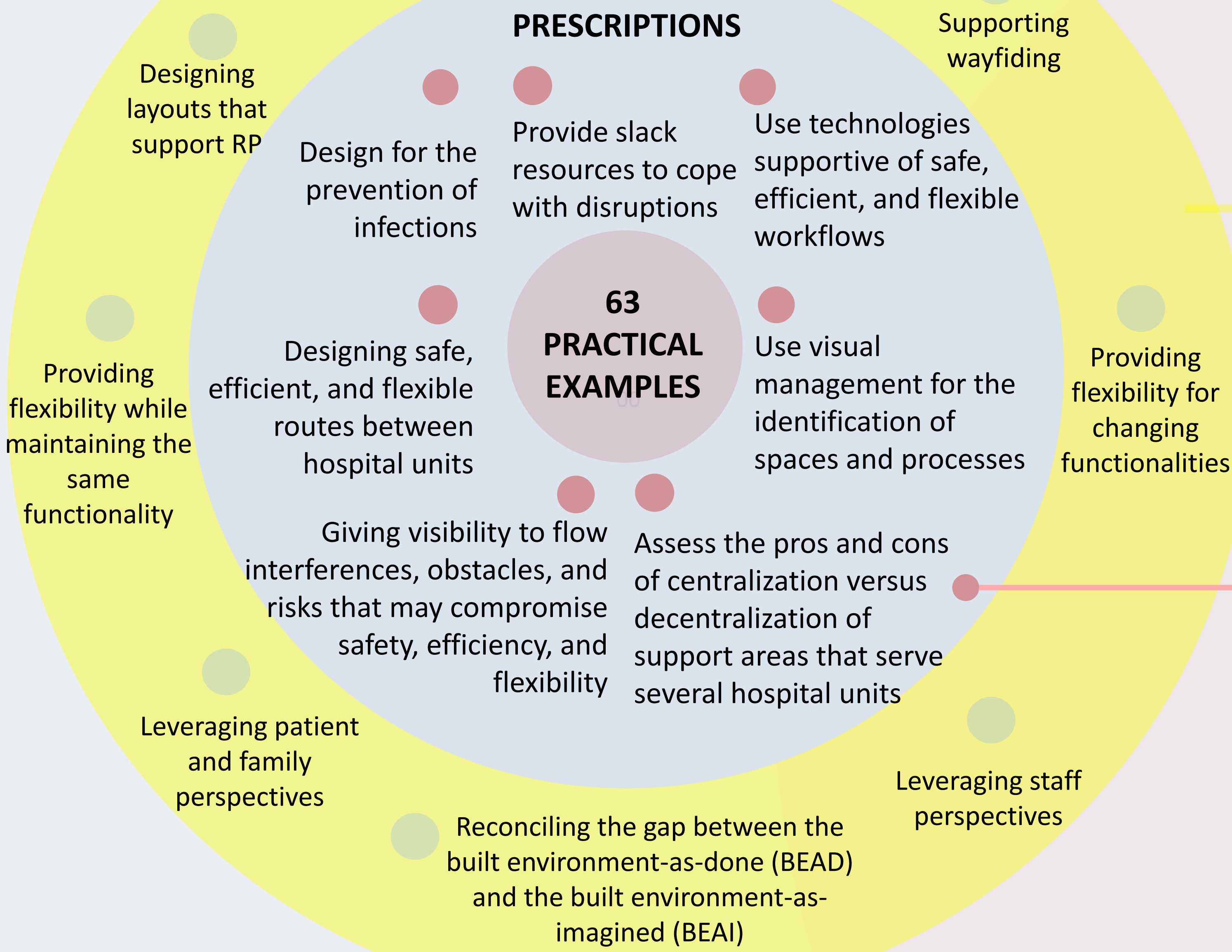
OBJECTIVE

THIS STUDY AIMED TO DEVELOP A FRAMEWORK TO PRESENT THE BUILT ENVIRONMENT DESIGN KNOWLEDGE FOR RESILIENT PERFORMANCE FOR INTERNAL HOSPITAL LOGISTICS IN THE C-ICU AREAS.

7 DESIGN PRINCIPLES

7 DESIGN PRESCRIPTIONS

63 PRACTICAL EXAMPLES

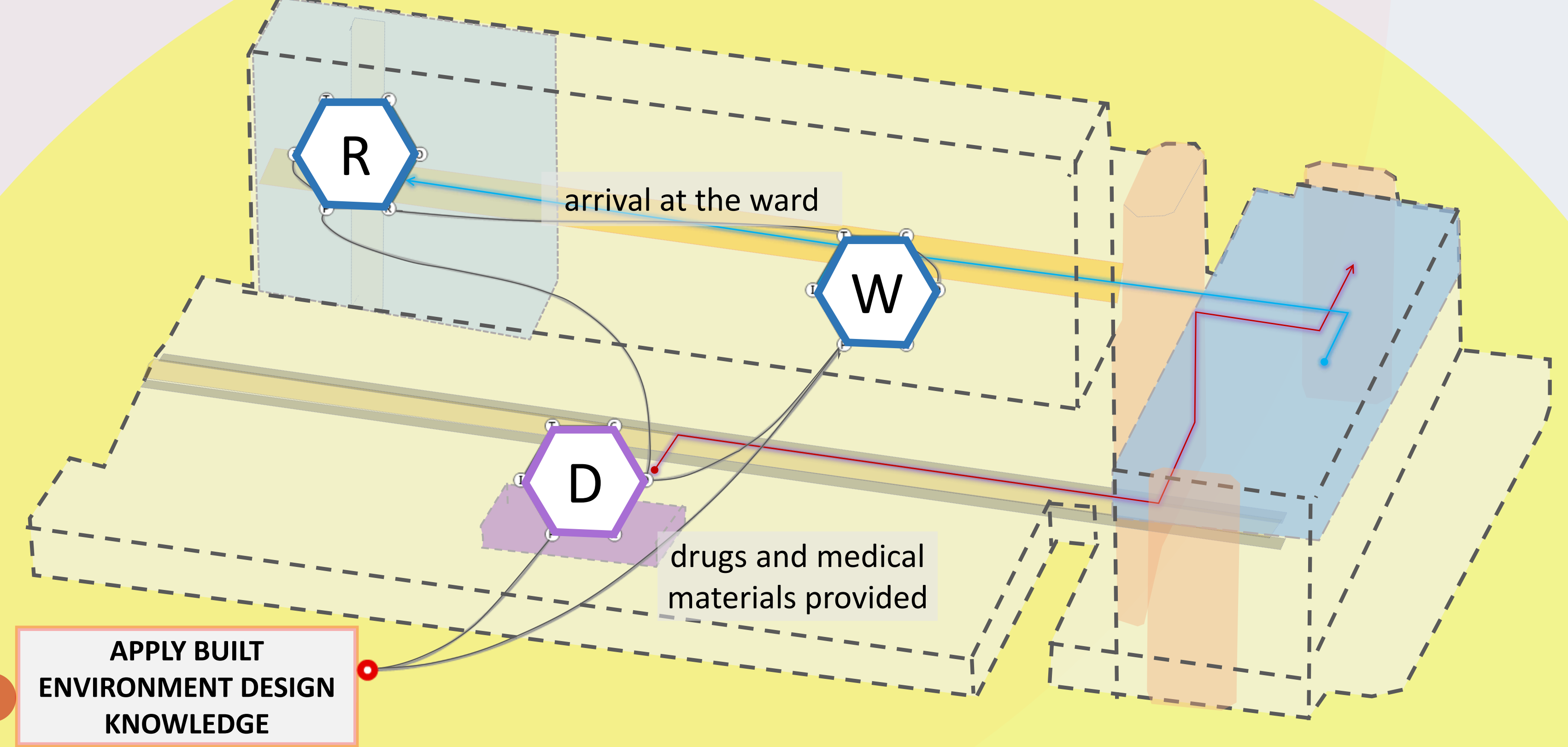


RESULTS

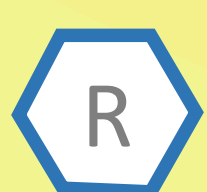
The resulting framework for built environment design knowledge for resilient performance in internal hospital logistics comprises **seven design prescriptions and 61 practical examples**. The built environment design prescriptions are presented in **Figure 1**. The structure encompasses 11 functions performed in the c-ICU areas and distributed according to the transportation of people and supplies. FRAM model helped discuss the consequences of neglecting the knowledge framework in a scenario in which the **neglecting of design prescriptions was identified as variability in the outputs of FRAM functions (Figure 2)**.

Figure 1. Schematic representation of the Built environment design knowledge framework for resilient performance in internal hospital logistics.

Figure 2. FRAM functions superimposed on the representation of the hospital complex in a scenario of patient resuscitation.



FRAM functions



Resuscitate patient (flow of people)



Go to the ward where resuscitation is required (flow of people)



Provide drugs and medical materials (flow of supplies)

c-ICU areas



Elevators



Corridors



Sidewalks

CONCLUSION

The framework is original in the context of hospital connecting areas. Thus, the study contributed to the meso level of resilient performance at the hospital level and offered detailed guidance to both built environment and logistics designers. **The framework is available to assist hospital planners in future design and remodeling of hospital connecting areas to ensure that they support resilient performance.**

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