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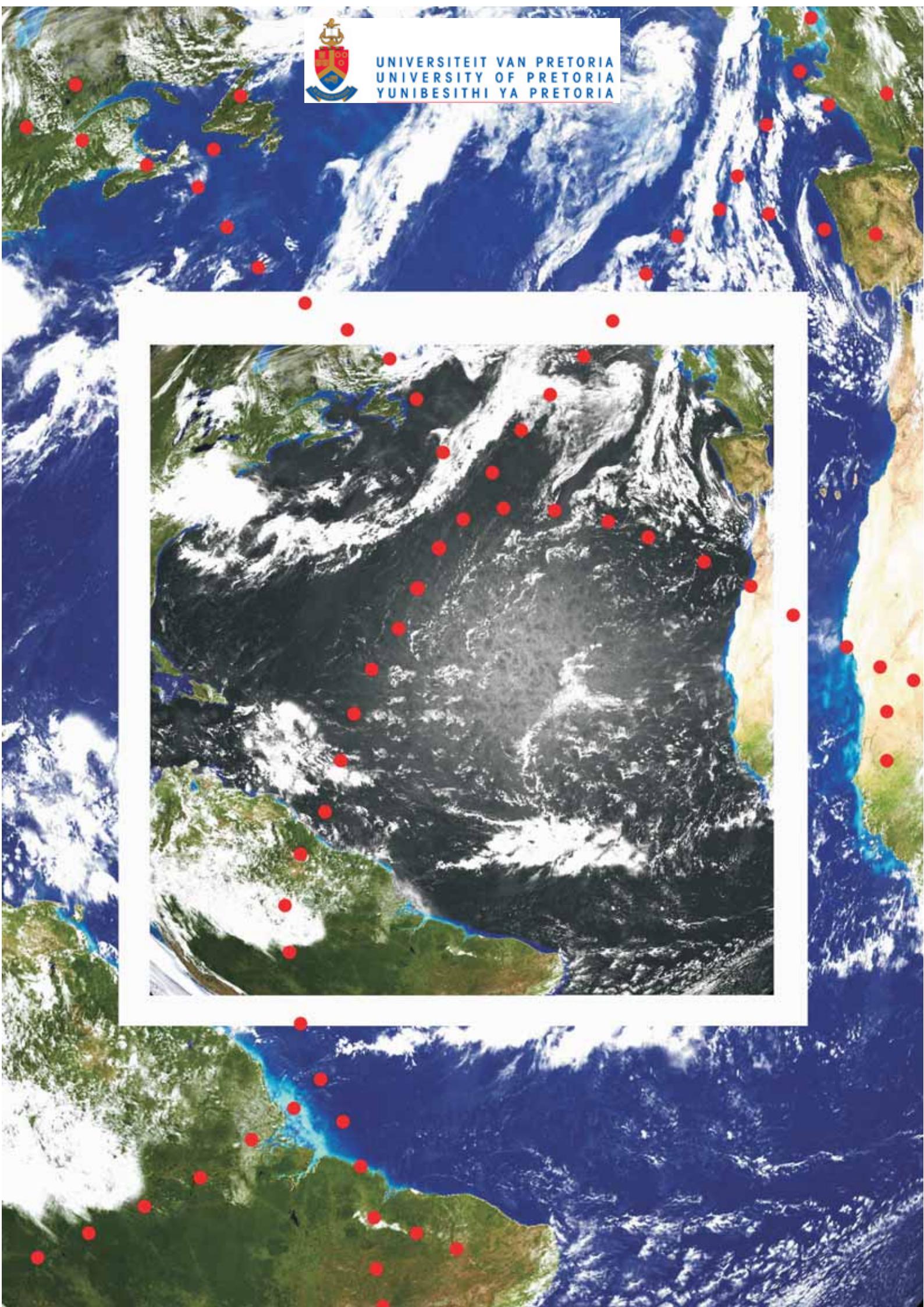
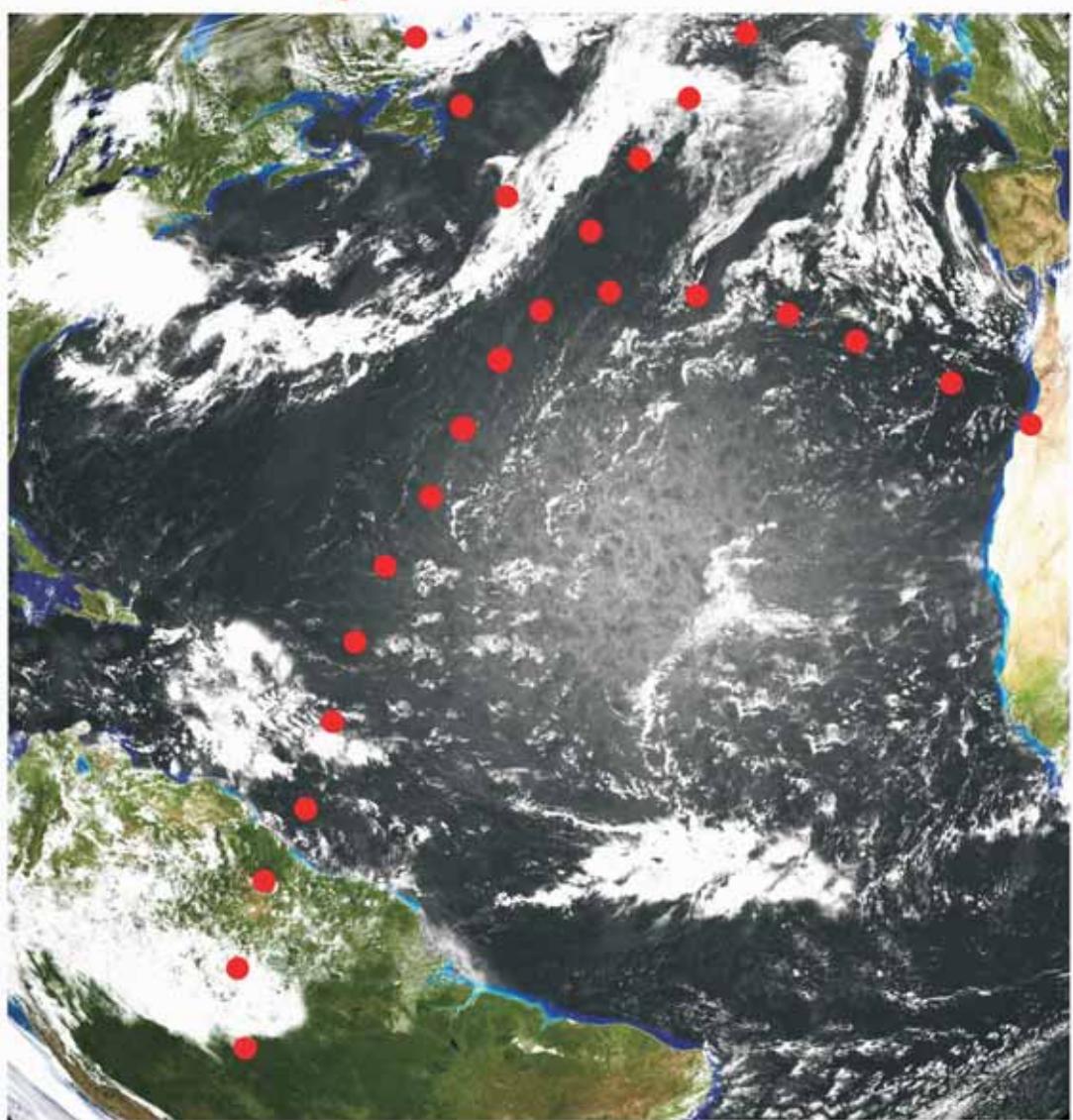
SAMPLING



(A) (B) (C) (D) (E) (F) (G) (H)



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THE WORLD BECAME VERY SMALL WITH THE WORLDWIDE TRANSPORT SYSTEMS, AIR TRAVEL, INTERNET, LAPTOPS, DELL PHONES AND GOOGLE.

TODAY THERE ARE A LOT OF OPPORTUNITY IN EXISTING TECHNOLOGICAL PLATFORMS LIKE THE SYSTEMS MENTIONED ABOVE THAT HAVE HAD A GREAT IMPACT ON THE WORLD. THERE IS A GAP THAT HAS FORMED BETWEEN A DISPOSABLE SOCIETY AND A ‘SLOWNESS’ IN ARCHITECTURE. TO BRIDGE THIS GAP ONE SHOULD LOOK AT CURRENT TECHNOLOGIES TO AID THE IMPLEMENTATION OF SYSTEMS THAT WILL CHANGE THE WAY ARCHITECTURE IS PERCEIVED TODAY.

THE SHIFT IN THE WAY ARCHITECTURE IS PERCEIVED SHOULD LEAN TOWARDS DISPOSABLE, RECYCLABLE AND REPLACABLE. THE WAY A BUILDING IS CHANGED BY DEMOLITION SHOULD CHANGE TOWARDS REPLACING OR ADDING ELEMENTS WITHOUT ANY DEMOLITION WORK.

THIS THESIS ADOPTS THE SAME TECHNOLOGY PLATFORM AS THE CAR, WITH STANDARDS TO BIND THE SYSTEM. PRE FABRICATION WILL BE THE PRIMARY PLATFORM ALLOWING THE SYSTEM TO ADAPT TO NEW TECHNOLOGIES AND MATERIALS. FOR WORLD WIDE IMPLEMENTATION OF THE SYSTEM IT WILL BE IMPORTANT TO STANDARDIZE THE BASIC ELEMENT IN THE STRUCTURE.

THE RECYCLING ASPECT WILL, ONCE A BUILDING IS DEMOLISHED, BE A SUSTAINABLE SOLUTION AGAINST THE TONS OF RUBBLE THAT IS THE RESULT OF TRADITIONAL DEMOLITION.

News Flash:
REDUCTIONS IN
TRAM A GOOD IDEA??



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..... WAS THE

SOLUTION

CAR FACTORIES CAN MANUFACTURE THE NEW HUGELY
SUCCESSFULL PODS, BECAUSE IT WILL FIT INTO THE ALREADY
IN PLACE MANUFACTURING PLANT.

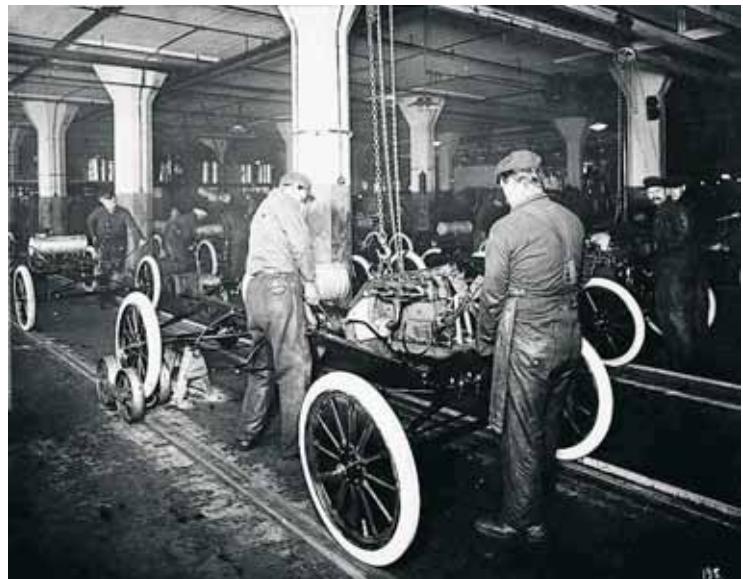


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ELEMENTS THAT CHANGED THE WORLD TO A FAST PACED SOCIETY WAS THE CAR AND AIRPLANE. TODAY THESE SYSTEMS STILL SERVE AS GREAT EXAMPLES TO HOW A NECESSITY CAN BE MANUFACTURED TO BE AFFORDABLE BY THE GENERAL PUBLIC. THESE ASSEMBLY PLANTS WORK ON A TECHNOLOGY PLATFORM ABLE TO ADAPT TO CHANGES IN MODEL RANGES.



3

HENRY FORD MADE IT POSSIBLE FOR THE GENERAL PUBLIC TO BE ABLE TO AFFORD A CAR, AND HE STANDARDIZED PARTS SO THAT IT COULD BE ASSEMBLED IN A CONTROLLED ENVIRONMENT. HE SET IN MOTION THE CONCEPT OF AN ASSEMBLY PLANT STILL BEING USED TODAY, EXCEPT THAT TODAY IT IS MOSTLY COMPUTERIZED.

THE LEVEL OF SUBSTITUTION IN CARS IS USUALLY TEN TIMES HIGHER THAN IN DWELLINGS, WHICH IS AN INDICATION OF HOW EASY IT IS TO SUPPLY AND REPLACE MOVEABLE PROPERTY. THE LEVEL OF SUBSTITUTION OF DWELLINGS IS VERY DIFFERENT, BECAUSE OF A NUMBER OF OBSTACLES.



4

WHEN DESIGNING A TECHNOLOGY PLATFORM ONE NEED TO TAKE INTO CONSIDERATION THE OTHER SYSTEMS IN PLACE, LIKE THE ROADS SYSTEM, WHERE ONLY CERTAIN SIZES CAN BE TRANSPORTED. IN THIS DISSERTATION THE MAIN SHAPING IDEA WAS THE USE OF A MODULE BEING ABLE TO BE TRANSPORTABLE NOT ONLY ON THE PUBLIC ROADS BUT ALSO ON EVERY OTHER TRANSPORTING SYSTEM THAT OPERATES ALL AROUND THE GLOBE. LOOKING AT THE SYSTEMS ALREADY IN PLACE TO DO TRANSPORT, THE POSSIBILITY TO CREATE A TECHNOLOGY PLATFORM THAT WILL BE ABLE TO WORK ALL AROUND THE WORLD BECOMES VERY BIG.

VARIATIONS OWN IDENTITY



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Trans-mute



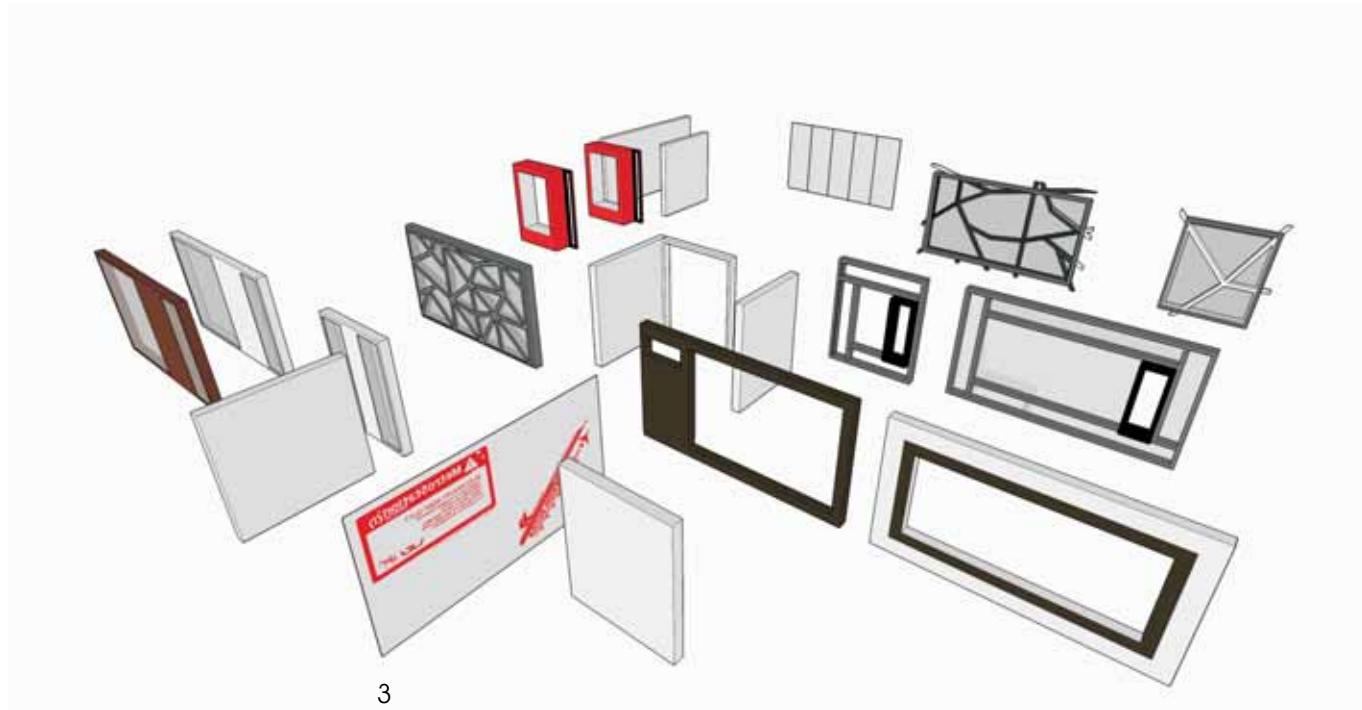
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CRITICISM AGAINST PREFABRICATION IS THAT IT BECOMES MONOTONOUS.
THIS BECAME A POINT OF DEPARTURE FOR DEVELOPING THE SYSTEM, HOW
CAN IDENTITY AND TASTE BE EXPRESSED WITHIN THE TECHNOLOGY
PLATFORM PROPOSED IN THIS DISSERTATION.

LOOKING AT THE CAR AS AN EXAMPLE AGAIN, THE VARIETY WITHIN THE MODELS
LIES IN THE DIFFERENT SHAPES OF THE PANELS AND THE FRAMEWORK. NOW TAKING
THE SAME APPROACH THE VARIETY FOR THE MODULES LIES IN THE PANELING AND
WINDOWS FIXED TO THE STANDARD STRUCTURE.



3



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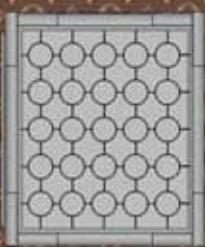
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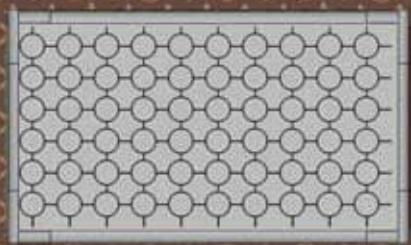
Front view



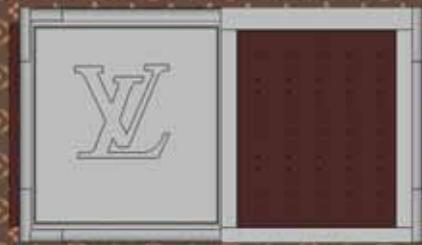
Rear view



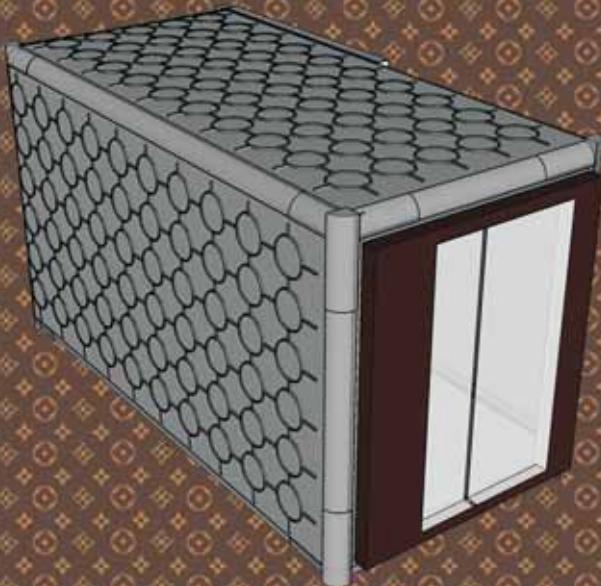
Window panel



Side view



Side view



3D view



1



3

WITH THE IMMENSE PRESSURE WE FORCE UPON THE WORLD'S RESOURCES FOR CONSTRUCTION MATERIALS, RECYCLING BECOMES EXTREMELY IMPORTANT. THE CHOICE OF MATERIALS IN THIS DISSERTATION WAS BASED ON THE FACT THAT IT HAD TO BE RECYCLABLE AND TO BE LIGHT IN WEIGHT. FINANCIALLY THE INVESTOR OF A BUILDING WILL PROFIT OUT OF THE RECYCLING OF HIS BUILDING MATERIALS. ONCE THE BUILDING IS BEING DEMOLISHED. ONLY WHEN PEOPLE WILL PROFIT FROM SOMETHING THEY WILL MAKE THE SHIFT TO A MORE SUSTAINABLE SOLUTION.



2

2ND HAND MARKET

WITHIN URBAN STRUCTURES, THE HOUSE IS SEEN AS A FLEXIBLE/ADAPTABLE PRODUCT RATHER THAN A FIXED FINAL PRODUCT. URBAN DESIGN IS AN INSEPARABLE COMPONENT OF HOUSING [DEWAR & UYTENBOGAARDT 1991] AND THIS ACKNOWLEDGES THE VARIOUS LEVELS OF THE ENVIRONMENT DIFFERING IN THE DEGREE OF PERMANENCE AND CHANGEABILITY THUS ALLOWING FOR MORE INVOLVEMENT AND AFFORDABILITY. THIS CHALLENGES OUR UNDERSTANDING OF INFORMAL ECONOMIES, SETTLEMENTS AND STRUCTURES AND OUR ROLE AS PROFESSIONALS IN INTERACTING WITH THESE ALTERNATIVE SYSTEMS AND "WAYS OF DOING/LIVING". (SCHEUBLEN & PRONK, 2006:2-116)

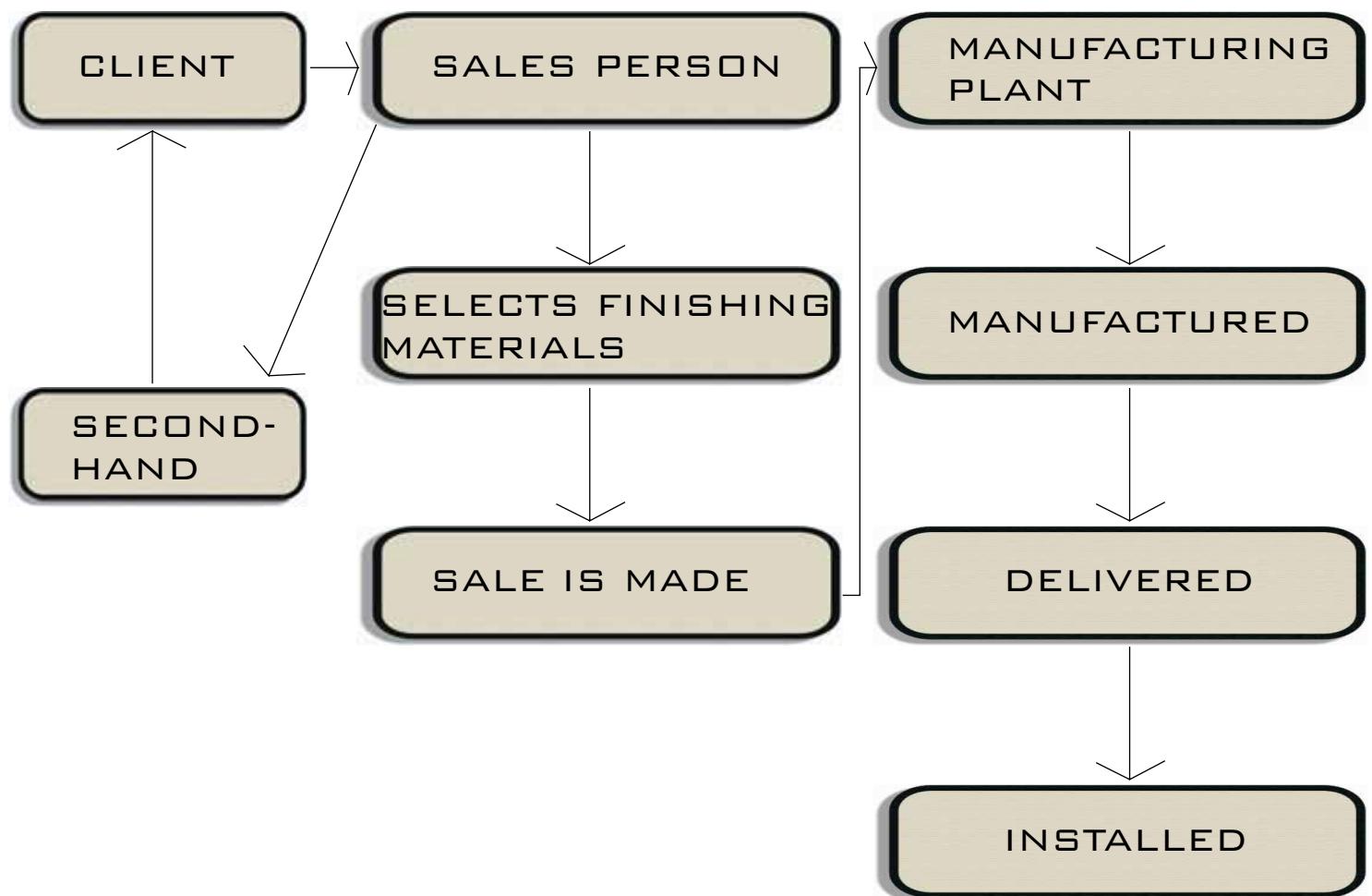
WITH THE PROPOSED TECHNOLOGY PLATFORM PRODUCING TRANSPORTABLE ELEMENTS THAT CAN BE ADDED OR REMOVED FROM THE BUILDING A **SECONDHAND** MARKET WILL DEVELOP GIVING THE LOW INCOME SECTION OF THE POPULATION THE OPPORTUNITY TO AFFORD A **SECONDHAND** HOME.

DESIGNED AND EMERGENT SYSTEMS [HAMDI 2004], ARE EQUALLY IMPORTANT AND IT IS STRONGLY BELIEVED THAT ANY APPROACH THAT DOES NOT ACKNOWLEDGE THE PRESENCE OF THE 'INFORMAL' AS A FORCE THAT CANNOT BE ERADICATED AND AS A LEGITIMATE POWER, ENERGY AND FORM OF EXPRESSION IS DOOMED TO FAIL. (SCHEUBLEN & PRONK, 2006:2-116)

SALE PROCESS:



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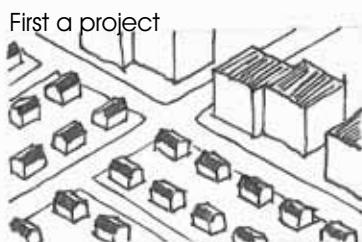


TECHNOLOGY P

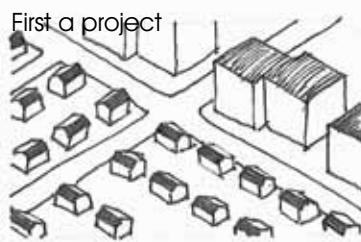


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SEMI-OPEN BUILDING SYSTEMS



First a project



First a project

Then a system



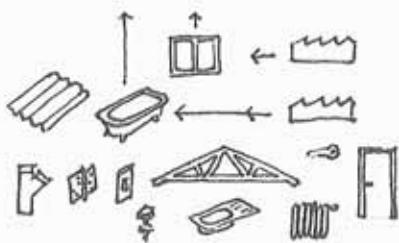
Mass-production
one end product

Then a system



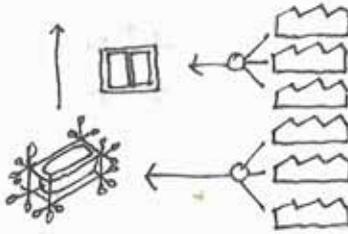
Mass-production
one end product

Always third party supply



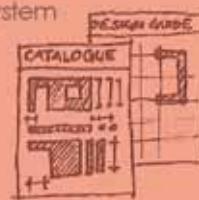
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THE PROCESSING OF SEMI-MANUFACTURED COMPONENTS BY TRADESMEN ON THE BUILDING SITE TAKES A RELATIVELY LONG TIME. CONSIDER, FOR EXAMPLE, THE HANGING OF DOORS, BRICKLAYING FOR OUTSIDE WALLS AND THE MANY TASKS PERFORMED BY TRADESMEN IN SANITARY AREAS. EACH OF THESE ACTIVITIES IS CARRIED OUT BY A DIFFERENT TRADESMAN, WHICH RESULTS IN POOR LOGISTICS. THERE ARE MANY INEFFICIENT INTERVALS BETWEEN SUCCESSIVE PROCESSES. NO ONE CONSIDERS HIMSELF RESPONSIBLE FOR THE NEXT ONE ALONG, WHO OFTEN HAS TO CLEAR UP THE MESS LEFT BY HIS PREDECESSOR.

Open supply



OPEN BUILDING SYSTEMS

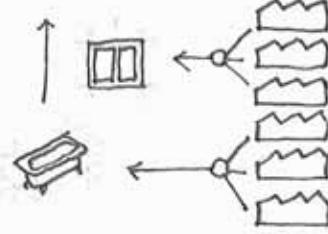
First a system



Then many projects

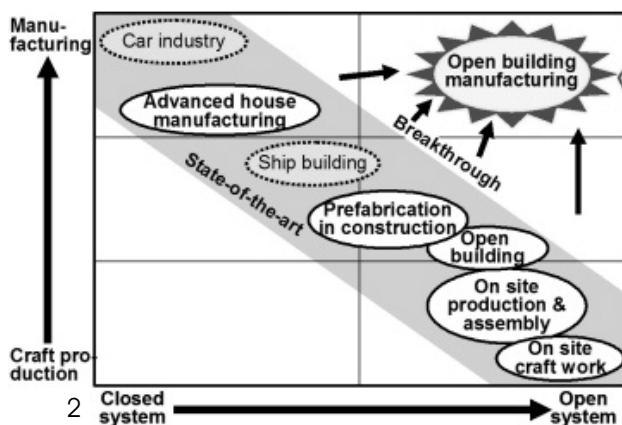


Open supply



FIRSTLY THERE WILL BE A SYSTEM IN PLACE AND PROJECTS WILL BE ABLE TO BE CONSTRUCTED FROM THIS SYSTEM, BUT THE CONSTRUCTION WILL TAKE PLACE IN ONE CONTROLLED ENVIRONMENT. THERE MAY BE SUPPLIES OF MATERIALS FROM DIFFERENT LOCATIONS BUT THE MODULES AND ALL THE PARTS AND THE ASSEMBLY THERE OFF WILL TAKE PLACE IN ONE ENVIRONMENT.

'THE TRADITIONAL PROCESS OF BUILDING A SIMPLE BATHROOM BEGINS WITH THE SHELL (WALLS AND CEILING). NEXT THE HEATING ENGINEER ARRIVES, FOLLOWED BY THE PLUMBER AND THE ELECTRICIAN (SOMETIMES ALSO THE VENTILATION ENGINEER), ALL OF WHOM, ONE AFTER ANOTHER, INSTALL THE CONNECTIONS FOR THEIR OWN PIPING OR CABLING. NEXT COMES THE PLASTERER FOLLOWED BY SOMEONE TO LAY THE FLOOR SCREED. THE PLUMBER THEN RETURNS TO INSTALL THE BATH. THE NEXT TRADESMAN TO COME ALONG IS THE TILER, TO TILE THE FLOOR, THE WALLS AND THE SIDE OF THE BATH, FOLLOWED BY THE JOINER, TO FIT THE DOORS. HE IN TURN IS FOLLOWED BY THE PLASTERER TO FINISH THE WALLS AND CEILING. THE HEATING ENGINEER, PLUMBER, ELECTRICIAN AND VENTILATION ENGINEER THEN RETURN IN SUCCESSION TO FINISH THEIR OWN PARTS OF THE JOB. THEY ARE FOLLOWED BY SOMEONE TO FINISH OFF THE JOINTS AND THE GROUTING. LAST OF ALL COMES THE PAINTER.'
(TU/E DELFT, 2006 :23)



Vision

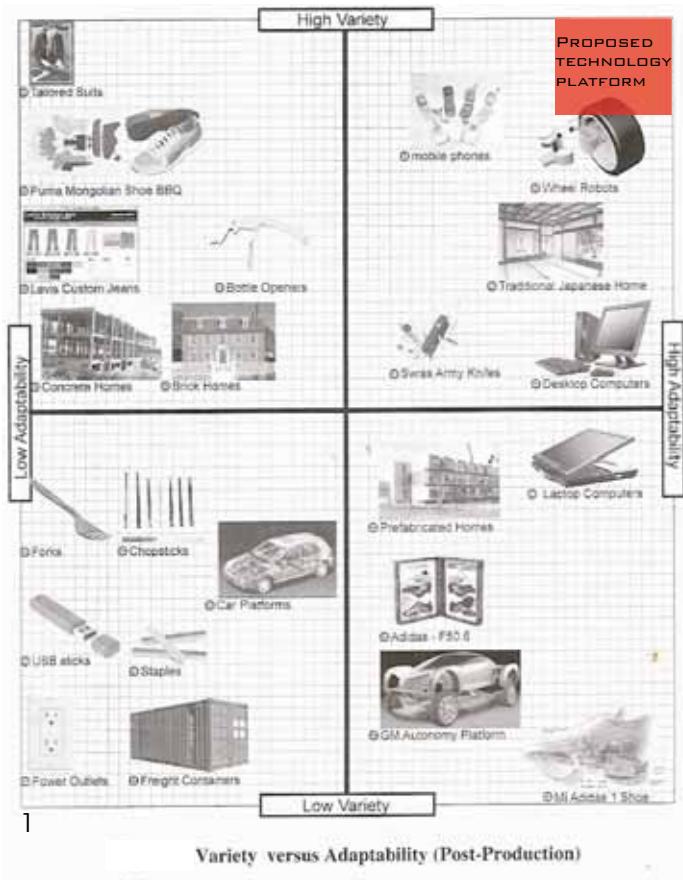
- ▶ Building construction as a knowledge based industry.
- ▶ Open system: products + process + production + ICT
- ▶ Effective production and open system combined!

THE TECHNOLOGY PLATFORM CREATES AN IDEAL OPEN BUILDING MANUFACTURING SYSTEM AS IT COMBINES A MID WAY BETWEEN THE MANUFACTURING PRINCIPLES OF THE CAR INDUSTRY AND THE CRAFT WORK ON SITE.

ADAPTABILITY / V



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5.2 LOW VARIETY, HIGH ADAPTABILITY

THE MI ADIDAS 1.1 SHOE ANCHORS THE LOW VARIETY, HIGH ADAPTABILITY QUADRANT [MI ADIDAS 1.1 2006]. IN CONTRAST, THE ADIDAS F50.6 TUN IT PREMIUM CLIMACOOL® SET SHOE OFFERS A HIGHLY MODULAR YET ADAPTABLE SHOE ARCHITECTURE, WHEREBY USERS CAN RECONFIGURE THE SHOE BY SWITCHING THE SHOE CHASSIS AND BODY TO DIFFERING WEATHER AND COMFORT POSITIONS [MI ADIDAS F50.6 2006]. SIMILARLY, THE GM AUTONOMY VEHICLE PLATFORM PROVIDES FUTURE CUSTOMERS AN ADAPTABLE SKATEBOARD LIKE CHASSIS WHICH CAN FIT TO DIFFERENT BODY CABINS [BURNS ET AL. 2002]. HOWEVER, VARIETY IS LIMITED TO THREE SIZES OF PLATFORMS. PREFABRICATED HOMES ARE ADAPTABLE TO DIFFERENT IN STILL CONDITIONS. OFTEN PREFABRICATED MODULES CAN BE CLUSTERED TOGETHER TO CREATE¹ NEW COMBINATIONS FOR GIVEN SPACE REQUIREMENTS. WITH INCREASING ADOPTION AND IMPROVEMENTS IN RAPID PROTOTYPING, VARIETY WILL INCREASE IN THE NEXT DECADES. LAPTOP COMPUTERS (LIKE DESKTOPS) ARE FUNDAMENTALLY ADAPTABLE PRODUCTS DUE TO THEIR PRODUCT AND SOFTWARE ARCHITECTURE. LAPTOPS ARE DESIGNED TO BE MOBILE. THEREFORE ADAPTABLE TO THE USER'S ENVIRONMENT: WHEREAS DESKTOPS ARE LESS MOBILE, BUT HAVE MUCH FREER PACKAGING CONSTRAINTS THUS ARE MORE ADAPTABLE FOR HARDWARE ADDITIONS. (RYAN, CHIN, PATRIK, 2006:3-209)

ADAPTIVE PRODUCT MODULES FOR MASS CUSTOMIZATION: LESSONS FROM VEHICULAR ARCHITECTURE DEVELOPMENT, RYAN C.C. CHIN, PATRIK KUNZLER

Y, LOW ADAPTABILITY

JCCUPY THE EXTREMITIES OF THIS QUADRANT BECAUSE EACH SUIT IS CUSTOMIZED ERGONOMICALLY FOR EACH CUSTOMER. SUIT MAKERS CAN COMBINE DIFFERENT MATERIALS AND STYLES TO CREATE INFINITE VARIETY. ONCE THE SUIT IS MADE, CHANGES ARE DIFFICULT TO ACCOMMODATE. PUMA INTRODUCED IN 2005 ITS LINE OF CUSTOMIZABLE SHOES [PUMA 2005]. TO DESIGN THE SHOE, CUSTOMERS SELECT COMPONENTS OF THE PRODUCT WHICH WAS ARE SENT TO THE FACTORY TO BE ASSEMBLED AND THEN SENT BACK TO THE RETAILER. LIKE THE TAILORED SUIT, VARIETY IS VERY HIGH, BUT ONCE CONFIGURED THE PRODUCT HAS VERY LITTLE ADAPTABILITY. MORE INFAMOUSLY, LEVIS INTRODUCED CUSTOM JEANS BY OFFERING A WEBSITE THAT ALLOWED CUSTOMERS TO SPECIFY THE EXACT FIT OF THE PANTS. IN THE BUILDING INDUSTRY, BRICK AND CONCRETE HOMES INHERENTLY HAVE HIGH VARIETY BECAUSE OF THE ENDLESS COMBINATIONS OF BRICK TYPES AND FORMWORK THAT CAN YIELD ENDLESS DESIGNS. HOWEVER, ONCE BUILT IN PLACE THESE ARCHITECTURAL EXPRESSIONS ARE VERY STATIC AND OFFER VERY LITTLE ADAPTABILITY BY THE USERS. CONCRETE BUILDINGS ARE LESS ADAPTABLE THAN BRICK BUILDINGS BECAUSE OF THE MONOLITHIC NATURE OF CONCRETE CONSTRUCTION. (RYAN, CHIN, PATRIK, 2006:3-209)

ADAPTIVE PRODUCT MODULES FOR MASS CUSTOMIZATION: LESSONS FROM VEHICULAR ARCHITECTURE DEVELOPMENT, RYAN C.C. CHIN, PATRIK KUNZLER

5.3 LOW VARIETY, LOW ADAPTABILITY

THIS QUADRANT OF THE DIAGRAM IS DOMINATED BY MASS PRODUCED PRODUCTS. HOUSEHOLD POWER OUTLETS HAVE VERY LITTLE VARIETY (EXCEPT FOR THE COVER PLATE) AND NEGLIGIBLE ADAPTABILITY. FREIGHT CONTAINERS COME IN ONLY A FEW STANDARD SIZES. TRUCK BEDS, SHIP CARGO BAYS, ETC. HAVE ALL BEEN DESIGNED TO FIT THOSE DIMENSIONS. USB MEMORY STICKS HAVE MORE VARIETY THAN POWER OUTLETS AND FREIGHT CONTAINERS, BUT LESS THAN UTENSILS LIKE FORKS AND CHOPSTICKS. COLLECTIVELY, THESE PRODUCTS HAVE VERY LITTLE ADAPTABILITY ASIDE FROM CREATIVE USES (I.E. USING CHOPSTICKS TO HOLD A HAIR BUN). THE AUTOMOBILE INDUSTRY HAS PERFECTED THE USE OF PRODUCT PLATFORMS BECAUSE OF THE INTENSIVE CAPITAL INVESTMENT NECESSARY TO DEVELOP A VEHICLE PLATFORM. FOR EXAMPLE, THE VOLKSWAGEN GROUP'S A4 PLATFORM IS THE BASIS FOR 8 DIFFERENT FRONTAND ALL-WHEEL DRIVE MODEL RANGES [A4 PLATFORM 2006]. (RYAN, CHIN, PATRIK, 2006:3-209)

5.4 HIGH VARIETY, HIGH ADAPTABILITY

SWISS ARMY KNIVES CAN BE ADAPTED TO SOLVE A MYRIAD OF PROBLEMS. DIFFERING SIZES AND COLORS ALSO MAKE SWISS ARMY KNIVES A HIGH VARIETY PRODUCT. MOBILE DEVICES LIKE CELL PHONES EXHIBIT HIGH DEGREES OF VARIETY NOT ONLY BECAUSE OF THE NUMBERS OF DESIGNS, BUT THE ENDLESS WAYS A USER CAN PERSONALIZE THE PRODUCT (PHYSICAL/VIRTUAL SKINS, DOWNLOADABLE RING TONES, ETC.). CELL PHONES ARE ALSO VERY ADAPTIVE IN POST PRODUCTION BECAUSE THE MODULAR ARCHITECTURE ALLOWS USERS TO SWITCH AND REPLACE BATTERIES, SIM CARDS, FACE PLATES, AND OTHER PHYSICAL COMPONENTS. THE TRADITIONAL JAPANESE HOME IS DESIGNED AND BUILT BASED ON THE 'KEN'. A TRADITIONAL PROPORTIONING SYSTEM [CHING 1979]. THE PRODUCT OF THIS PROPORTIONING SYSTEM IS ARCHITECTURAL FMM OF INFINITE VARIETY AND HIGH LEVELS OF ADAPTABILITY. WITH THE INTRODUCTION OF FLEXIBLE AND MOVABLE WALL PARTITIONS (WHICH WERE ALSO PROPORTIONED USING THE KEN), SPACES COULD BE ADAPTED TO FIT DIFFERING SPATIAL NEEDS. DESKTOP AND LAPTOP COMPUTERS STRADDLE THE LINE BETWEEN LOW AND HIGH VARIETY AND WITH THE CONTINUED DEMAND FOR MORE CUSTOMIZABLE PRODUCTS WILL ONLY SEE AN INCREASE IN BOTH VARIETY AND ADAPTABILITY. (RYAN, CHIN, PATRIK, 2006:3-209)

HIGH VARIETY; HIGH ADAPTABILITY;

POSITION ON GRAPH FOR PROPOSED TECHNOLOGY PLATFORM.

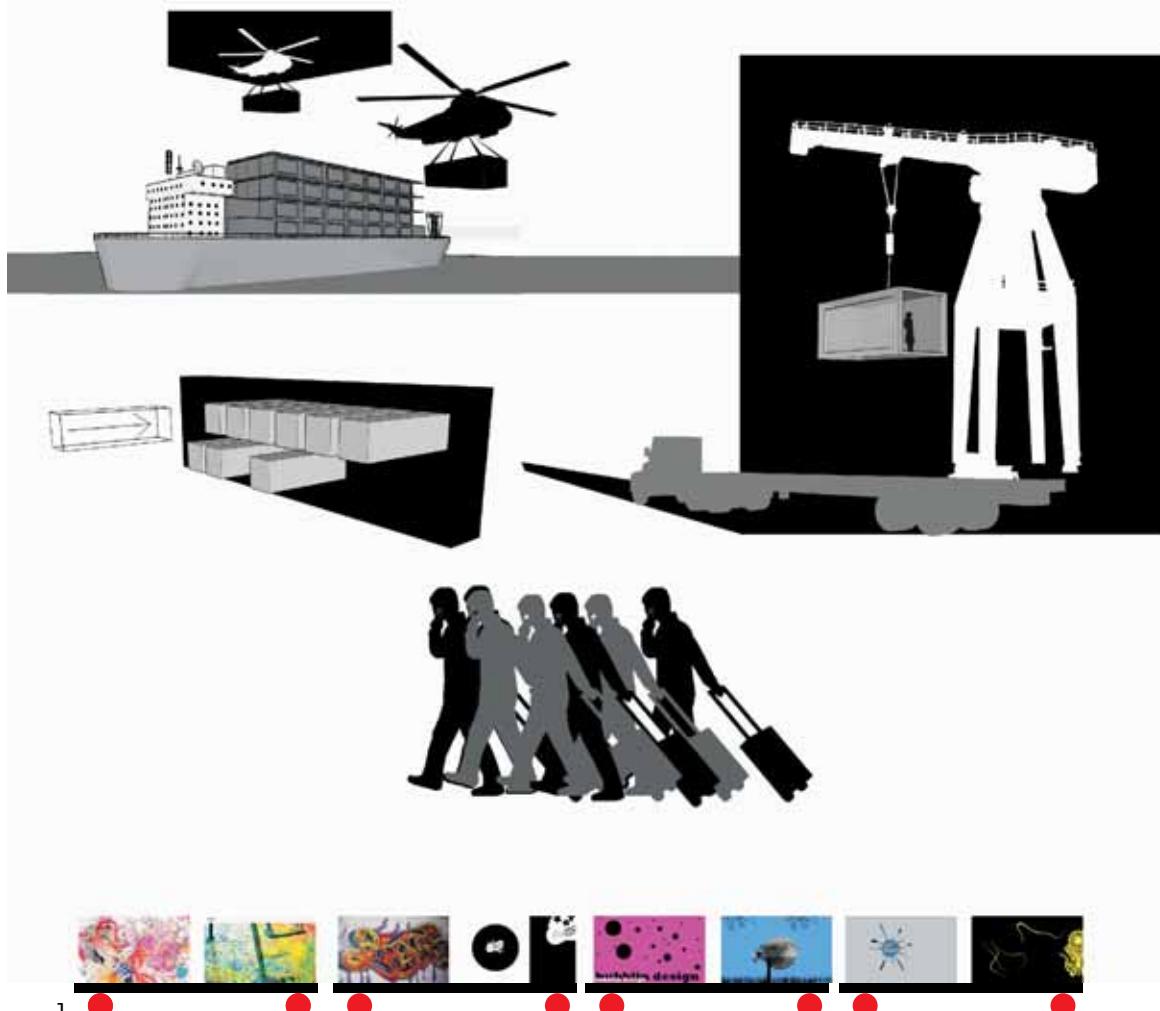
THE HIGH VARIETY LIES IN THE DIFFERENT OPTIONS OF EXTERIOR PANELING AVAILABLE. THE FRAMES CAN BE INTERCONNECTED WITH ONE ANOTHER GIVING ENDLESS VARIATIONS FOR FLOOR PLAN LAYOUTS AND CAN ADAPT TO NEEDS, TOPOGRAPHY, CITY FLUCTUATIONS, REQUIREMENTS, NEW SHOP/RESIDENCE OWNER AND CHANGING NEEDS OF THE USER.

THE DIVERSE DESIGNS POSSIBLE WITHIN THIS TECHNOLOGY PLATFORM ALLOWS ADAPTABILITY TO CHANGES IN FASHION AND TECHNOLOGY OVER TIME.

WITH ALL EXTERIOR PANELS, WINDOW PANELS AND INTERIOR SUB-SYSTEMS (KITCHEN AND BATHROOM) THAT HAVE STANDARD FIXINGS, THE USER CAN PERSONALIZE THE PRODUCT.



TODAY TECHNOLOGY ALLOWS PEOPLE TO BECOME MORE MOBILE WITH THE AID OF LAPTOPS, CELL PHONES AND THE EXTENSIVE NETWORKS OF TRANSPORT POSSIBILITIES AVAILABLE TO TRAVEL ANYWHERE IN THE WORLD IN A SHORT PERIOD OF TIME. INFORMATION OVERLOAD AND THE TIME FRAME IN WHICH THE RAPID GROWTH OF INFORMATION AND CHANGES IN TECHNOLOGY TAKES PLACE IS BECOMING EVER SHORTER. ADAPTING BECAME THE ONLY WAY OF SURVIVAL.
THIS PROPOSAL AIMS TO AID THE ADAPTIVE NOMADIC PERSON WITH A HOME WHICH CAN ACCOMMODATE HIM ON HIS JOURNEY.



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